Telephony.

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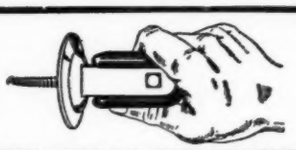

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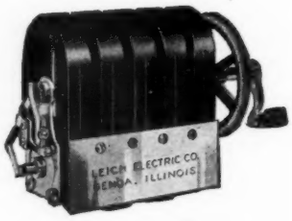

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Telephony.

THE AMERICAN TELEPHONE JOURNAL

Comprising Telephony, American Telephone Journal, Telephone Weekly, Telephone Magazine, Telephone Securities, The Telephone, Sound Wave

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CURRENT OPINIONS AND COMMENTS

There is a right and a wrong way to do everything, and it makes all the difference in the world which way is adopted. Success and smiles follow the one; trouble and frowns result from the other.

We all have disagreeable things to do in business—disconnect the telephones of delinquent subscribers, satisfy grumpy customers, handle diplomatically the complaints that may exist mainly in the minds of the kickers, try to collect uncollectible accounts, and other similar unpleasant tasks.

The real measure of success is how we get away with these jobs that are disagreeable. There is food for much thought along this line in a suggestion made by General Manager J. P. Boylan of the Rochester Telephone Corp. in the address he made before the Up-State Telephone Association of New York, which could be elaborated with profit by all telephone men.

* * * *

The point of contact between the company and the subscriber is often—if not usually—one of these disagreeable moments when either the subscriber is complaining or when the company is trying to obtain its rights. Either the subscriber is kicking on the service or the company is handling a slow payer or trying to placate a dissatisfied patron.

If cases like these can be handled so as to improve the company's public relations, so far as that particular subscriber is concerned, that would be clever, efficient management, indeed.

As Mr. Boylan points out, it is not impossible. In fact, these very contacts, unpleasant though they can easily be made, present opportunities of exceptional value in building up good will for the company.

When service is to be discontinued for lack of payment, instead of firing a curt, peremptory letter to the subscriber, warning him that if he doesn't pay up by a certain date his telephone will be silenced, the company can tell him the same thing in a way which will make him understand the company's position, make the desired collection and spread the gospel that a utility company deserves more consideration than it ordinarily gets.

* * * *

It gives the company an opportunity to lay before the telephone user information that will help its public relations and lead to a better understanding with its patrons. The average citizen knows and thinks little about such matters, but if pains are taken to advise him why it is necessary his bill should be paid on time, or why he has to wait to have a telephone installed, the effect will be beneficial.

Few "kickers" will remain "kickers" when care is taken to convince them that the company is doing its best to give them service under difficulties. Give them the facts. The vaudeville rule, "Tell 'em nothing," doesn't hold good in public service work any more.

* * * *

Nothing has been more effective in stopping, or reducing, complaints about telephone service than giving publicity as to the number of calls exchange operators handle daily. Mr. Average Man never stopped to think of it, but when he is told of the many thousands of calls that load the wires, he is amazed, and he honestly wonders how "Central" gets along and makes so few mistakes. Thereafter he isn't so quick on the complaint trigger because he knows something of the difficulties.

It is good publicity. It is the right way to answer—or forestall—criticism, and proves again the great importance of giving the telephone public the facts.

* * * *

If telephone companies would plan to have the local newspapers from time to time print news stories about what their operators are doing in the way of handling the service, the number of calls, the time of day when the peak load arrives, the diminishing number of service complaints, the reasons therefor, and other similar information to enlighten the public, they would find it most helpful publicity.

It would interest the telephone users, and influence them to be more considerate; it would, in short, tend to create good will.

For instance, take the letter published in last week's issue in which the chief operator of the Kansas Telephone Co., at Ottawa, Kans., recited some service figures. Forty-one reports of slow answers and recalls in 1920, only eight in 1921, and six in 1922. Nine reports in four years, of alleged cases of discourtesy to subscribers—four in 1918, two in 1920, three in 1921

and *none in* 1922. Small details, maybe, but of real value as showing how the company watches things and endeavors to perfect service conditions.

That is the sort of information to get into the local papers, and there is no doubt the telephone users of Ottawa would be interested in reading about it. Probably the local manager has already given it to the press. If he hasn't, he is overlooking an opportunity.

It isn't always the big news, the financial statements, that catch the eye of the average reader and stick in his memory. It is the sidelights, the small, intimate details, that are easily understood.

* * * *

TELEPHONY received a letter recently from the "Societa Italiana Telefoni Privati," of Milano. Although not versed in the Italian language, we figured it out that the name meant in English "Italian Private Telephone Society," as distinguished from the government-owned system which has prevailed in that country.

The letter called attention to the decision of the new Italian government to sell its telephone system, and stated that the society is intending to buy the equipment and furnish service, making an initial payment of 100 million lire.

* * * *

Commenting on the end of government ownership in Italy, the Chicago Journal of Commerce says editorially:

"In one country, at least, business, the government and the people are in accord in condemning state socialism, in encouraging private enterprise and in reverting to the age old, sound principles of business. In Italy railways, telephones, telegraphs and other utilities are to be returned to private ownership, but neither business, the government nor the people propose to wait until that is done to effect economies.

Bureaucracy is being terminated. Business men are being put in charge of government utilities, waste is being eliminated and administration simplified. Unity and sanity are the outstanding characteristics of business and government in Italy today. Thus fortified, Italy is now in a stronger position than France, despite statistical evidence to the contrary."

New York City Talks To England

Long Speeches Sent Over 70 Miles of Cable and Open Wire From New York City and Then By Radio to Southgate, England, 3,400 Miles, Easily Understood By Marconi and Other Engineers and Scientists

The Atlantic ocean has been spanned by wireless telephone! Officials of the American Telegraph & Telephone Co. in New York City sent messages and made speeches by wireless telephone Sunday night, January 14, to Southgate, England, where Guglielmo Marconi, inventor of the radio, and many others listened and cabled back that the words with few exceptions were distinctly heard.

Scattering words and phrases have been wirelessed across the ocean before, but thousands of words were shot over the distance of 3,400 miles Sunday night and heard apparently with the distinctness of messages over the wire between stations a mile or two apart.

The deluge of words crossed the ocean so steadily and easily that the group of auditors on the other side began to complain that it was something of a bore. One cable message demanded more "color" in the messages being sent to the other side. Another cable message from the listeners in England said that they were tired of the American accent and asked to hear the voice of a Britisher. A search was made for a night janitor at the American Telegraph & Telephone building at 195 Broadway, but he had left.

After talking steadily from 9 o'clock to 11 o'clock the voices of the officials of the company began to grow tired, and they stopped to take a rest before resuming. Every few minutes word came by cable from the listeners in England telling how well the messages were heard, in spite of the fact that they sometimes had difficulties with the American accent.

Years may elapse, it was said, before the wireless telephone will be adapted for commercial transatlantic or transpacific use. "We are in the middle of our experiments, not at the end of them," said General J. J. Carty.

The messages sent out Sunday night may have been heard, it was said, at stations in Europe, South America, California and the Pacific, although this is not likely. The apparatus which concentrates the message in a few wave lengths makes it difficult for ordinary receiving sets to pick it up. Special receiving sets were used in England.

No messages were telephoned back from England because there has not been time to ship send apparatus and set it up there. This will be done soon, making possible conversations by transoceanic radiophone.

The first message was sent by President H. B. Thayer of the American Telephone & Telegraph Co., at exactly 9 o'clock. Eleven minutes later a cable message was received confirming the fact that the message had been received. Vice-president J. J. Carty followed President Thayer with a brief message.

At 10:10 o'clock the following cable message from Marconi was received:

"President Thayer and General Carty,
A. T. & T. Co.

I have just listened to your radio telephonic message which I have heard distinctly and congratulate you and all those connected with the research which has led to this achievement.

G. MARCONI.

Even Intonations Are Recognized.

One of the first messages in reply from the other side came from Major T. J. Purves, chief engineer of the British Postoffice, who cabled at 9:35:

I have listened with great interest and pleasure to the far-flung voices of Mr. Thayer and Mr. Carty. Of Mr. Thayer's message, I recognized every word. I missed a little of Mr. Carty, but recognized his well-known intonations. Send best respects and warmest good wishes to our friends of the A. T. & T. Co.

PURVES.

A few minutes later a cable from the group at Southgate said:

"Audience wants local color."

Another message a few minutes later said:

"Some listeners have trouble with the American language."

Those Who Heard Speeches.

The following list was made public in New York of those who listened at the English station:

Captain Brandy of the British Air Ministry, Sir E. Murray, Major T. J. Purves, R. A. Dalzel, F. J. Brown, E. H. Shaughnessy and Mr. Linton of the British Postoffice, Dr. W. H. Eccles and A. A. C. Swinton of the British Institution of Electrical Engineers, S. J. Goddard of the Western Union Telegraph Co., Captain Miles of the United States Embassy, Sir A. Shirley Bonn of the Associated Chambers of Commerce, G. Marconi and Godfrey Isaacs of Marconi's Wireless Telegraph, Ltd., representatives of British scientific publications, Chief European Engineer Frank Gill of International Western Electric Co.

In the first message sent, President Thayer spoke as follows:

This is Mr. Thayer of the American Telephone & Telegraph Co. speaking from 195 Broadway, New York City, through the Rocky Point station of the Radio Corporation of America.

The radio apparatus and system used in this test is made possible by coöperation between the American Telephone & Telegraph Co. and the Radio Corporation of America and is the result of research and experimental work in the laboratories of the American Telephone & Telegraph Co. and in the laboratories of the Radio Corporation of America and its associated companies.

In 1915 the American Telephone & Telegraph Co. transmitted a message across the Atlantic by radio telephone from Arlington, Va., to the Eiffel Tower in Paris, where it was heard and understood by our own engineers and by others. During 1915 we also sent a telephone message from Arlington part way across the Pacific ocean to the Hawaiian Islands, where it was heard and understood by our own engineers and by officers of the United States Navy.

Since then great improvements have been made in the art not only of radio but of telephony and of radio telephony. In the experiments which we are now conducting we are making use of these improvements.

Beyond a small group listening for this message in England, I do not know whose ears this message may reach. To all who hear it, I wish health and prosperity. Will you who are now hearing it inform me that you have heard it and tell me how clearly it comes to you?

In a later message, President Thayer introduced an allusion to the "rebellion" of 150 years ago, saying that rebelliousness was something of a Yankee characteristic, and he continued:

"There would have been no rebellion or cause for rebellion if there had been the facilities for communication then that are here now. I hope that this new method of communication, when it becomes commercial, will be another bond between us and the mother country, as many of us whose ancestors come from England still consider it."

Improvement in the Science.

At the conclusion of his message, Mr. Thayer issued the following statement on the subject:

We talked across the Atlantic in 1915, and we also sent a telephone message across the Pacific to the Hawaiian Islands. Both of these messages were heard and understood at their destinations.

Since then, the radio art, the art of telephony, and that of radio telephony have been greatly improved. Our experiments with radio telephony have been continuous and have been going on for years. For these latest tests we have had the use of the station of the Radio Corporation of America at Rocky Point, Long Island.

It is now generally recognized that the chief utility of radio telephony is to be looked for in situations where wires cannot be used. These experiments are part of our effort to determine to what extent the radio telephone may ultimately be employed in talking across great bodies of water where talking through telephone wires is not feasible. We are making steady progress, but there is much more to be done before we can speak definitely about establishing practical commercial radio telephone service across the Atlantic.

The tests we are now conducting are adding a great deal to the knowledge of the art. Some very important data have been obtained from the work of the American engineers sent to England and of those here. The tests have been very rigorously conducted, and for weeks our scientific staff has been sending signals of many kinds under a great variety of conditions. Selected words with no context as a guide to their meaning have been repeated thousands of times. The quality of transmission at all times and under all circumstances and the functioning of the special receiving apparatus set up in England, as well as that in America, have been observed with extreme scientific care.

Tonight our experiments had reached the stage where we wished to try complete sentences, and we sent out the messages that were received so successfully. This was done as part of our experimental procedure, and in England a number of additional observers were on hand when the messages were received. The results of the experiment as reported by cables just received were very gratifying.

Technical Phases Described.

The following explanation of some of the technical phases of the achievement was made:

"One of the developments which has been in progress since the telephone company's demonstration of transoceanic radio telephony in 1915 has to do with the perfection of high powered vacuum tubes. The tubes used in the present tests are characterized by a large external anode which is cooled by water. By virtue of water cooling, each tube can readily handle as much as ten kilowatts of power.

In the present installation, which is located at the large Rocky Point station of the Radio Corporation of America, the final stage of amplification comprises a small group of these tubes operating in parallel. The output of 100 kilowatts is delivered to the antenna and, due to a new system of radio transmission employed, is as effective as 300 kilowatts would be in the systems commonly used.

In the systems commonly in use about two-thirds of the energy goes into waves other than those which comprise the message, these waves being needed by many of the receiving sets in use for detection of the message. The new system suppresses the waves which do not comprise the message and reception is accomplished by generating locally at the receiving set a small high-frequency current which corresponds in frequency to the suppressed waves. In the present tests, this frequency is 55,500 and corresponds to a wave length of 5,400 meters.

The present system differs from the usual radio transmitting systems in another important respect. The usual type of transmitter sends out, in addition to the group of waves which does not comprise the message, two groups each of which does carry the message.

In the new apparatus only one of these groups is radiated. This makes possible the sending of twice as many messages at the same time without interference. This feature is particularly important at long wave lengths. The present system was perfected in connection with the so-called carrier telephony which is now in use in this country on certain long distance telephone lines.

Speak From 195 Broadway.

Mr. Thayer and the others who spoke to England Sunday night used a telephone located in the offices of the American Telephone & Telegraph Co. at 195 Broadway, New York City. This telephone instrument was connected to the radio equipment at Rocky Point by a telephone circuit about 70 miles long, half of it being underground cable and half open wire, and containing telephone repeaters and equalizers of a type similar to those used on long distance telephone lines.

The distance from Rocky Point to New Southgate, England, is about 3,400 miles. Prior to the tests of Sunday evening other tests were made to measure the transparency of the atmosphere to radio messages over such great distances. Measurements were also made on the strength which the signals received in New Southgate must have in order to be clearly heard above the noise of static and interference from other radio stations.

For the purpose of these tests large numbers of disconnected, single words were transmitted. The use of disconnected words constitutes an unusually severe trial of any telephone system. In ordinary conversation the continuity supplied by the thought is a great aid to the understanding of each word. It is intended to continue these measurements over a sufficiently long period of time to supply the most reliable data.

The measurements thus far made serve to indicate that transmission at night is better than during the day. The strength of signals received during the night may be hundreds and even thousands of times stronger than those received during the day. However, it has been found possible to transmit telephone messages satisfactorily during daylight, provided interference is not too great."

Not So Good on Land.

The improved long distance wireless telephone is not likely to play any great part in transcontinental telephoning or other long distance telephoning by land, it was said, because of the fact that the wireless waves travel badly over land as compared to water.

One of the phases for future development is that of daytime operation. The sun kills radio transmission over great distances, but the A. T. & T. engineers hope to produce instruments which will keep radio communication open around the world 24 hours a day.

Another advantage of the wire is privacy, as against the publicity of wireless telephoning, which, under Sunday night's

conditions, is literally "telling the world." No method has been discovered to prevent the interception of wireless telephone messages, although the great wave length and the suppression of unessential waves by the new apparatus makes the message impossible for the ordinary station to capture.

The fact that the first half-century of telephoning has nearly drawn to a close was emphasized Sunday night in the speech of General J. J. Carty to the British audience. He said:

"Alexander Graham Bell, the inventor of the telephone, was born March 3, 1847, in Edinburgh, Scotland. He went to Canada in 1870, and the next year he removed to Boston. While at Boston, in the summer of 1875, he invented a telephone which faintly transmitted parts of words and even entire words.

It is related by Thomas A. Watson, Bell's assistant, that it was on March 10, 1876, over a line extending between two rooms in a building at Boston, that the first complete sentence was ever spoken and heard through the electrical telephone. It was spoken by Prof. Bell and heard by Watson, who recorded it in his notebook at the time. It consisted of these words: 'Mr. Watson, come here; I want you.'

The experiments which we are now making represent some of the advances which have been made in the first half century of the telephone art, which is now drawing to a close. They belong to the golden age of communications which has achieved the extension of the spoken word throughout both space and time.

But this golden age has not yet ended, and when we contemplate the possibilities of the future, we discover that it has only just begun. It is to the future that we must now turn our minds and direct our endeavors."

Pennsylvania's Best Convention

Annual Meeting of the Pennsylvania State Telephone and Traffic Association at Harrisburg Last Week Demonstrated That That State's Telephone Men Are Very Much Alive to the Requirements of Their Business

The third annual convention of the Pennsylvania State Telephone and Traffic Association—which was held January 11, 12 and 13 in the Penn-Harris Hotel in Harrisburg—emphasized the fact that Pennsylvania telephone folk take a deep interest in their association and in eacn other. They went to Harrisburg some 300 strong and were very much alive to telephonic affairs—both current and future.

Socially, as well, they proved that they like each other and don't have to go outside of their own field of endeavor to enjoy themselves.

A very good exhibit of the latest in telephone equipment was "put on" by the manufacturers and many favorable comments were passed on the improvements that have been made.

The operators' conference, under the leadership of W. S. Vivian of the department of public relations, Automatic Electric Co., developed many good papers and discussions. The good results of the conference will be evidenced in the work in the operating rooms of exchanges all over the state.

President H. E. Bradley, of the association, opened the convention with an address of welcome in which, after greeting the delegates and expressing the satisfaction it gave the officers to have so many telephone men take an interest in the association's activities, he outlined what has been done during the year just closed and what is the work of the immediate future.

It was pointed out by President Bradley that if the association is to continue to exist and to be of real benefit to the member companies and to the industry in general, each member must do his part —that there must be no let-up of that progressive spirit which has brought them to their present place in the telephone field.

W. S. Vivian, manager of the department of public relations of the Automatic Electric Co., Chicago, was then introduced. He spoke on "The Purpose of the Operators' Conference," explaining just how it would make their work more efficient and telling the many benefits to be derived from their becoming acquainted with each other.

Professor N. C. Miller, head of the department of engineering extension of the Pennsylvania State College, discussed the value of "Employe Training" and brought out the fact that the college is preparing to start a correspondence course of study for telephone employes. It is designed to give them the equivalent of a high school education. Professor Miller's address was followed by a general discussion of the subjects which should be incorporated in such a course.

President H. E. Bradley Is Now in His 21st Year in Association Work in Pennsylvania.

The session closed with the election of a new board of directors and the appointment of committees.

The directors are: H. E. Bradley, Harrisburg; E. M. Prisk, of Hazelton; J. F. Stockwell, Philadelphia; C. L. Baer, Harrisburg; C. A. Carl, Lancaster; G. B. Rudy, York; E. D. Schade, Johnstown; J. H. Wright, Meadville; K. B. Schotte, Kittanning; J. Z. Miller, Erie; and W. S. Paca, Oil City.

The personnel of the resolutions committee included: E. M. Prisk, E. D. Schade, C. A. Carl, A. O. Black, of Butler, and W. S. Paca.

The principal address at the Friday session was delivered by Fred B. MacKinnon, president of the United States Independent Telephone Association. Developing the topic, "The Two Groups in the Telephone Industry," Mr. MacKinnon pointed out the relations between the Independent companies and the Bell.

In a plea for the smaller companies, Mr. MacKinnon declared that they "should be praised for the service they perform and not penalized."

"The Importance of Accounting to Public Service Companies," was the subject of a talk by G. S. Call, chief of the bureau of accounts and statistics of the Pennsylvania Public Service Commission.

"Twenty years ago," said Mr. Call, "public service companies, especially the small ones, kept their accounts on the back of old envelopes and on check stubs. An accountant was then considered a bookkeeper out of a job and was only called in to assist when the executives of the company suspected the cashier of dipping a little too freely into the cash drawer.

"Bookkeeping then brought out a fine specimen of penmanship but little else.

The marvelous growth of accountancy has been aided greatly by the income tax law and the efforts of the public service commission to fix uniform rates for smaller companies.

"Accurate accounts are necessary to find out the financial condition of a company and to find its financial progress in order that justifiable rates may be levied that will not be excessive and yet bring a fair return to the people that have their money invested in the industry."

Walter Spofford, of Harrisburg, telephone engineer of the Pennsylvania commission, spoke on the progress that has been made in the art of telephony and stressed the fundamentals to be observed in connection with the conduct of the telephone business.

He called the attention of the telephone men to the fact that there are now some 15 millions of telephones in use in the United States, compared with two telephones 50 years ago, and that in Pennsylvania one million instruments are now in use. He cautioned them, however, that there are many problems now to be faced and many to come up in the future.

James J. Lewis, Philadelphia district, manager of the Utilities Mutual Insurance Co., spoke on the safety of the employes of the telephone industry.

"About 98 per cent of all accidents," said Mr. Lewis, "are caused by inefficiency—either of a human being or a machine. The Bell company found that a majority of the accidents of its construction force were caused by axes. By substituting a saw for the axe 40 per cent of the accidents were avoided."

Ralph Bloomsburg, safety engineer of the company, took up the talk of Mr. Lewis and stated that during the period that the United States was actually engaged in the world war, 126,000 fatal accidents occurred in this country taking a bigger toll of life than the war. The days lost by workmen in 1919 through accidents was equivalent to three days for each man, woman and child in the United States.

"Every accident," said Mr. Bloomsburg, "contains two factors, a human being and an object. The man must appreciate the danger and be taught how to avoid it and the object must be made safe. Safety is the one great common meeting point of labor and capital."

At the closing session on Saturday morning, H. E. Bradley was reëlected president of the association, and thus began his 21st year of association work in Pennsylvania.

The other officers elected for the ensuing year are: Vice-president of the eastern division, C. A. Carl, of Lancaster; vice-president of the western division, K. B. Schotte, of Kittanning; secretary-treasurer, C. L. Baer, of Harrisburg.

Members of the executive committee are: H. E. Bradley, C. A. Carl, K. B. Schotte, E. M. Prisk, and J. H. Wright.

Resolutions were passed at the last session on the deaths of James C. Kelsey and T. J. Shufflin.

The operators had quite an important part in the convention, too. Besides being the subject of discussion during most of the first session, they held a conference of their own and listened to some very interesting and beneficial talks.

Miss Florence Ringling, of Erie, assistant chief operator of the Mutual Telephone Co., presented a paper on "Operators' Problems and Qualifications," that brought home several important facts and was well received.

"The Tributary Office," was discussed by Miss Marion Lacey, of Erie, chief toll operator of the Mutual company, and there were several other talks worthy of merit.

W. S. Vivian, of Chicago, had charge of the operators' sessions, which drew an attendance of about 100.

That the social side was not neglected was demonstrated by the fact that a jolly, good time was had at the banquet Friday night. The Pioneer association's initiation ceremonies furnished the big feature of the entertainment and went over big.

There is now a systematic ritual for the initiation, which requires about 15 actors and from 30 to 45 minutes to complete. The work is done in costume, and while there is just as much fun as ever, it also has its serious side. It is planned to make this a feature of all state conventions.

At the Pioneers' meeting Mr. Bradley was deposed as its president through the efforts of Mr. MacKinnon and Mr. Blomeyer, of the Automatic Electric Co., Chicago, and Mrs. Bradley was unanimously elected in his stead. However, she very kindly delegated Mr. Bradley to act in her place for the balance of her term of office.

Another feature of Friday evening was the "community singing" in which every member was obliged to join under the direction of D. J. Morgan, of Wilkes-Barre. This was followed by a radio concert and dance.

Tickets were distributed Thursday for that evening's performances at the various theaters.

Looking at it from all angles, the meeting was one from which much good may be expected to develop. At least, the telephone men and the operators went away with a determination to make the service in Pennsylvania the best in the United States—and, therefore, in the world—and to bring every telephone person in the state into the association.

A Lesson from a Smile.

By Miss Anne Barnes,

Traveling Chief Operator, Iowa Independent Telephone Association, Des Moines, Ia.

I see from my window a boy making a snow man. The body is as big and round as the boy has been able to make it.

What kind of a face will he fashion? I wait curiously to see. He is smiling as he chisels the snow man's features with a stick. Now he is standing back to view the result of his work. Behold a jolly looking snow man with a big, broad smile.

The boy's face is round and happy, like the snow man's. As I look at the boy my wish for him is, that time, environment, experience and events will not chisel out that smile.

And so I learn a lesson from a small, happy boy who made a big, happy looking snow man.

Chisel a cheerful line on the faces of people whenever you can.

Utility Problems Misconception of Function of Regulation.

H. L. Cook, who has just retired from the Nebraska State Railway Commission after two years of service, in the course of a statement to the public giving some observations on regulation, says that the public utility problems, insofar as they relate to public control, are largely due to the general misconception of the whole purpose and function of regulation. He said in part:

"They assume that the regulators are the sole representatives of the people and that regulation means holding down rates. The fact is that regulation means increasing rates when they need to be increased and decreasing them when it is necessary to decrease them. So far as being the representatives of the people, that is true, but it must be remembered that the utilities are a part of the people.

"Millions of people own the utilities. The people, therefore, are not properly represented when only one side of the function of regulation is performed. Regulation, in my mind, is simply a secondary means of helping utility companies to meet the demands upon them for adequate service.

"The bringing about of an enlightened and sympathetic feeling by the public toward the utility is one of the problems of the utilities at the present time. The other is the problem of financing the requirements of the utilities in order to meet the demands that the public is making and will make upon them for their services.

"For the solution of these two important problems, the coöperation of the regulatory bodies and the operators of the public utilities is absolutely necessary. When the state assumed the right to regulate utilities, it took upon itself the obligation to safeguard them in their rights to earn a fair return on their property; otherwise, adequate service for the public becomes impossible."

Telegraph and Telephone Circuits

Phantom Telephone and Combined Telegraph and Telephone Circuits Worked at Radio Frequencies—Simultaneous Transmission—Concluding Installment of Paper Presented Before the Institution of Electrical Engineers, England

By J. G. Hill

It is assumed that the principles of loading are understood. When the phantom circuit is loaded, a separate and extra coil is usually required for it at every loading point (see Figs. 9 and 10). It will be seen that the phantom-circuit coil is so arranged that a current sent round each side-circuit coil in an inductive direction passes round the two halves of the phantom-circuit coil in opposite directions, so that no inductance is produced in the coil.

On the contrary, currents flowing in the phantom-circuit coils in an inductive direction pass through the windings of the side-circuit coils in a non-inductive direction. The theoretical electrical action in the loaded side and phantom circuits is shown in Fig. 10 and it is thought that the diagrams will be found self-explanatory.

The formula for the attenuation of a side and phantom circuit when ωL is great in proportion to R and ωC great in proportion to G, which is the general case, is

$$\beta = \frac{R + \left(\frac{R_1}{L_1} + \frac{G}{C}\right) L}{2} \sqrt{\left(\frac{C}{L}\right)} \quad \ldots (9)$$

where R_1/L_1 is the effective resistance of the coil, divided by its inductance.

Within practical working limits, this ratio can be made constant for a side-circuit coil and for a phantom-circuit coil respectively, the two series of coils (side and phantom), however, being independent and separate; the ratio of the circuit leakance G to the capacity C at a fixed frequency for different values of C is also constant. The other symbols have been already defined.

Assuming R_1/L_1 and G/C to be the same for the side and phantom circuits, the same value of β is obtained for both circuits, if the side circuit has double the inductance of the phantom circuit, and if the side circuit has one-half the capacity of the phantom circuit. As shown in the preceding paragraphs, however, the capacity of the phantom circuit in underground cables is only about 50 per cent greater than that of the side circuit, so that the arrangement just described does not hold good.

In practice, the relative efficiency of transmission of the side and phantom circuits is largely determined by commercial conditions as well as electrical possibilities, the main considerations being as follows:

It is economical to space loading coils as widely apart as possible in order to obtain a given average inductance per mile, but it can be shown that the wider the spacing, the more the higher frequencies which enter into the composition of speech are cut off, and beyond a certain cut-off point telephonic speech becomes indistinct and impossible.

Owing to the indeterminate nature of the frequencies entering into speech it is necessary to make experiments to determine the widest permissible spacing. The rule hitherto obtaining as a result of experiment in Great Britain is as follows:

$$CDL = 25 \quad \ldots\ldots\ldots\ldots\ldots\ldots (10)$$

where C is the capacity of the cable circuit in microfarads per mile, D is the distance in miles separating the coils and L is the inductance of the loading coil in millihenrys.

This rule applies to circuits of length, say, not exceeding 350 miles. Beyond that point the upper frequencies are too much attenuated and other phenomena become evident, making it necessary to reduce the inductance without altering C or D in formula (10). Again, in practice it is economical to have only one set of manholes to accommodate both side and phantom loading coils.

The most economical arrangement for the two side circuits generally leads to the greatest total economy of the four-wire combination, and the position of the manholes is, therefore, made to suit the side circuits; this means that there is no choice of spacing for the phantom coils.

The only thing that can be done for the phantom circuit is to increase its inductance above the hypothetical value of one-half that of the side circuit up to the limit permissible by the spacing rule, and this procedure gives a phantom circuit having a lower attenuation constant and, therefore, a higher transmission efficiency, than the side circuit, usually to the extent of 15 to 25 per cent. (owing to the relatively smaller capacity of the phantom circuit and its higher degree of loading).

For a given transmission equivalent—say S miles of standard cable—between two given fixed points, such for example as a transmission equivalent of 15 miles of standard cable between London and Leicester, it is possible to find the cheapest possible combination of loading coil and cable (including side circuits and phantom circuits) which will produce the required transmission efficiency. This is obtained from the formula

$$P = \frac{A}{C}\left(x_2 + 2 + \frac{1}{x_2}\right) + \frac{B\sqrt{C}}{x_2 + 1} \quad \ldots (11)$$

where

P=the combined cost of one mile of cable pair and its loading,

$A = RP_1$ where R is the resistance of one mile of a known and selected conductor pair and P_1 its cost,

$B = \sqrt{(x/R)}P_2$ where $x = Lm/L$. Lm is the maximum loading of the conductor, of resistance R, and L is the loading which when combined with R gives the required attenuation constant β. P_2 is the cost per mile of providing L and includes coils and manholes.

$C = R(x+2+1/x) = R_2(x_2+2+1/x_2)$. Here $x_2 = Lm_2/L_2$, which is the maximum loading Lm_2 for R_2 divided by an inductance L_2, which inductance, when associated with R_2 in a cable pair gives the required β. R_2 and L_2 are the unknown values which may be derived from x_2.

It will be evident from the preceding description that the circuit arrangement of a loaded phantom circuit is complex. In order to balance such a circuit perfectly the potential in the A and B wires of the side circuits (which are joined in parallel, see Fig. 10) must be equal for all the frequencies of the voice and, unless the impedances of the A and B lines (in magnitude and phase) are equal at all points equidistant from the sending end, the want of electrical balance will result in overhearing if the permissible limits of unbalance are exceeded.

Now the loading of the circuits augments the difficulties which may have ex-

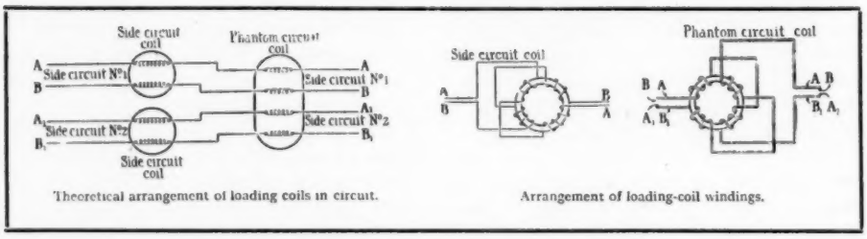


Fig. 9. Arrangement of Coils in Loaded Side and Phantom Circuits.

isted in the unloaded pairs, principally because the circuits have thereby become more efficient carriers of energy, and also due to the shortened wave length—and this applies both to the circuit in which the

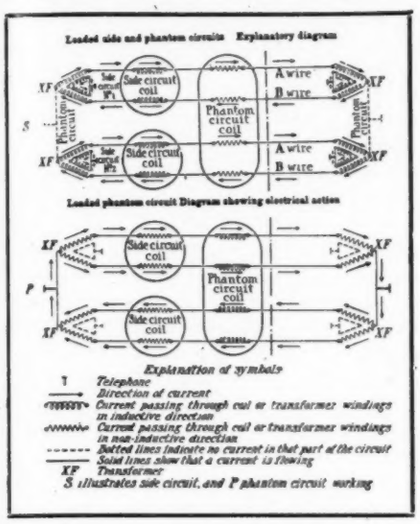

Loaded side and phantom circuits Explanatory diagram
Side circuit coil
Phantom circuit coil
A wire
B wire
XF
S
P
Loaded phantom circuit Diagram showing electrical action
Explanation of symbols
T Telephone
Direction of current
Current passing through coil or transformer windings in inductive direction
Current passing through coil or transformer windings in non-inductive direction
Dotted lines indicate no current in that part of the circuit
Solid lines show that a current is flowing
XF Transformer
S illustrates side circuit, and P phantom circuit working

Fig. 10. Theoretical Electrical Action in Loaded Side and Phantom Circuits.

over-hearing arises and contiguous circuits which transmit the augmented disturbance more efficiently than before.

Alternatively we may say that if the circuits are long enough, the mean voltage in a loaded circuit with the same applied E.M.F. is greater than in an unloaded one, and any want of equality in the constants of the *A* and *B* lines will result in a greater difference of potential between them, resulting in greater overhearing between the side and phantom circuits, and in cross-talk between the side circuits.

In order to secure a perfect balance, the resistance, capacity, inductance and leakance of the four wires of a phantom circuit must be theoretically equal. It is possible to a large extent to control the equality of the conductor resistance of the cable in the factory. The inductance and effective resistance of the loading coils in a coil-loaded cable can also be very closely balanced. In the loading coils used by the Post Office a variation of not more than 0.25 per cent between the inductance of the two halves of the same loading coil and not more than 0.1 ohm between the direct-current resistance of the two halves of the same coil is guaranteed. A variation of not more than 2 per cent in the inductance of different coils is required and is possible.

The leakance of the cable can also be efficiently controlled in manufacture, supplemented by care in laying the cable, and it does not cause appreciable difficulty. The electrostatic capacity of each wire in a four-wire core of the cable cannot, however, be sufficiently equalized in an economical manner in the factory to produce phantom circuits which do not give rise to serious overhearing between side and phantom-loaded circuits in the same four-wire core (or four wires making up the phantom circuit). Special steps are, therefore, taken to equalize the capacity of the wires in each four-wire group during the process of laying. This is a recognized necessity in all countries where loaded phantom cable circuits are used.

The steps taken result in reducing the cross-talk between the side circuits, as well as making it possible to use the phantom circuits. It may be noted that the necessity for balancing arose primarily owing to overhearing between loaded side and phantom circuits. It was formerly common practice to work unbalanced and loaded cable pairs in cables which did not contain phantom circuits.

As a matter of interest it may be placed on record that the first loaded phantom-circuit experiments in this country were carried out, and the possibility of this type of loading demonstrated, between Liverpool and Manchester in 1908.

As specially designed loading coils were not available for the phantom circuit coils, telephone transformer coils were used as a substitute, the equal windings of a separate transformer being used for each of the two side circuits which made up the phantom circuit, i. e. an arrangement equivalent to two separate phantom coils for the phantom circuit at the same geographical point, instead of one in the Western Electric Co.'s design. In 1912 it was further demonstrated in this country that phantom circuits in the type of cable then available when using the best available loading coils, were subject to marked overhearing between the side and phantom circuits; but the difficulties were quickly overcome.

Owing to the introduction of two-wire telephone relay working, a degree of accuracy of capacity balance is now required which was not considered necessary for loaded phantom circuits without relays. The main reason is that the telephone relay augments the speech current in the circuit, and where there are several relays the attenuated current arriving at any given relay station may be augmented to approximately the same amplitude as that originally sent from the office of origin, whereas in a long loaded circuit without relays the current is attenuated progressively and continuously in accordance with the compound interest law.

As a consequence, the mean disturbing voltage in the circuit is much higher in the case of the relayed than the unrelayed two-wire circuit. Contiguous relay circuits have also a greater transmission efficiency, and transmit disturbances with greater intensity than in the case of unrelayed circuits.

It is well known that in some cases there is at present an advantage in utilizing four wires for one telephone underground loaded and relayed circuit, two wires being used for the sending circuit and two for the receiving circuit. This is largely because such an arrangement makes it posible to utilize a much higher degree of relay amplification and to use smaller gauge conductors than in the two-wire relay circuit, or, alternatively, to obtain a louder speech volume with the same type of conductor than is possible with the two-wire system (see British patent No. 29,165 of 1913 by A. S. J. Van Kesteren).

It is not difficult to foresee that the greater amplification of speech energy results in greater inductive disturbance in contiguous circuits. In such cases, four-wire circuits are not usually phantomed at present, but cross-talk in adjacent side circuits may nevertheless arise, particularly at the sending end of the cable and at relay stations, notwithstanding the best possible balancing of capacity.

As a consequence it becomes necessary to separate the sending circuits from the receiving circuits. It should be noted that the received currents although they may be of great amplitude are often materially less than the sent currents.

In view of the importance of the problem of balancing of capacity in underground cables, a considerable amount of attention has been devoted to it in this country. The necessary conditions for producing the required capacity balance have been fully worked out, theoretically and practically.

The following general remarks may be of interest:

As already mentioned, the form of cable utilized for loaded, phantomed and relayed underground circuits is of the M. T. type and it is usually made up of conductors weighing 20 lbs. or 40 lbs. per mile per wire. The number of wires varies with the service requirements up to 308 pairs per cable. Each four-wire core in a cable is balanced in short lengths, because if the lengths taken were too long, the electrical balance of the constants would not be the same for different frequencies. The complete unit taken for independent balancing is a loading-coil section.

The maximum length of a section hitherto adopted in this country is 2.6 miles, but present practice favors 1.6 miles and 1.125 miles. Each loading-coil section is subdivided into lengths if one-tenth of a mile, and these are usually tested separately, and combined with other similar lengths to produce the best result in the loading-coil section.

It can be shown that the impedance of a sufficiently short length of cable measured from one end of the cable with the distant end open, depends essentially on the capacity and leakance of the length under test, while with the circuit closd, only the resistance and inductance enter into the measurement. These facts form the basis of the procedure.

The leakance, taking into account the high insulation now obtainable, and the in-

ductance of short unloaded lengths of cable, are relatively unimportant as factors in causing overhearing in the type of cable considered. An insulation of 10,000 megohms per mile per wire in air-space paper cable is now obtainable when measured by direct current, but the effective leakance at 800 periods per second corresponds to only about 1 megohm per mile, wire to wire. The inductance per mile per pair is 1 mH.

The capacity system of a four-wire core may be represented by 10 capacities between different wires and between wires and earth, and it can be shown that from six capacity measurements the necessary combinations to avoid overhearing and cross-talk can be deduced (see Fig. 11). These measurements are made by means of a double bridge specially designed for use on the road.

Apparatus is also designed for the rapid measurement of the degree of equality of the resistance of the conductors. Special steps, however, are required in the factory to reduce the out-of-balance of resistance as far as possible, and this is considered much preferable to compensation on the road by crossing. The reduction of road balancing of resistance to a minimum is, therefore, aimed at. Incidentally it may be mentioned that it is highly important that the cable constants, including capacity, should be made as uniform as possible in the factory, in view of the exacting requirements of modern developments and the difficulty in replacing non-uniform cables when faulty.

The amount of out-of-balance of capacity and resistance which can be permitted depend essentially on the relation between these quantities and the corresponding amount of cross-talk and overhearing resulting from them; tests of these quantities are therefore necessary. The cross-talk meter is used for this purpose. This instrument, designed by the Western Electric Co. and manufactured in this country by the Cambridge & Paul Instrument Co., is a distortionless artificial cable, the readings being expressed in terms of millionths of the current entering the cross-talk meter, instead of the more usual arrangement of reading in miles of standard cable. It is, however, easy to convert from the one set of readings to the other.

The instrument is arranged to have a constant sending-end impedance of approximately 666 ohms, no matter what equivalent attenuation length is in circuit; this impedance is generally not the same as the section of cable under test, and this complicates to some extent the interpretation of the results.

The comparative overhearing test is made by means of telephones of standard type, by speaking on the circuit giving rise to the interruption (say a side circuit) which is closed by a resistance equal to the characteristic impedance, and listening on the disturbed circuit (say a phantom).

The degree of intensity of the sound is observed in the receiver and the telephones are then switched over to the cross-talk meter, which is altered until a sound of the same intensity is heard in the receiver as before. The number of millionths recorded on the dial of the cross-talk meter then indicates the magnitude of the overhearing.

The relation between the capacity measurements and the observed cross-talk is such that if the following values are not exceeded the result is usually satisfactory (see Fig. 11):

$$\begin{aligned} 2(p+q)+u &= 110\ \mu\mu F \\ 2(r+s)+v &= 110\ \text{“} \\ (p-q &= 80\ \text{“} \\ u &= 200\ \text{“} \\ v &= 200\ \text{“} \end{aligned}$$

This, however, assumes a uniform distribution of capacity unbalance. In abnormal cases these figures may not correspond closely enough to the mean overhearing and cross-talk observed in normal cases. The overhearing and cross-talk must, however, at present always be taken as the ultimate criteria, inasmuch as they indicate the necessary commercial requirements.

As regards resistance unbalance, there is no fixed rule, but experience shows that the difference in resistance of the *a* and *b* wires expressed as a percentage of the loop resistance does not usually exceed a mean value of 0-05. The question of capacity balancing has received considerable attention in America and Germany.

Siemens and Halske, Berlin, have patented a process for balancing capacity

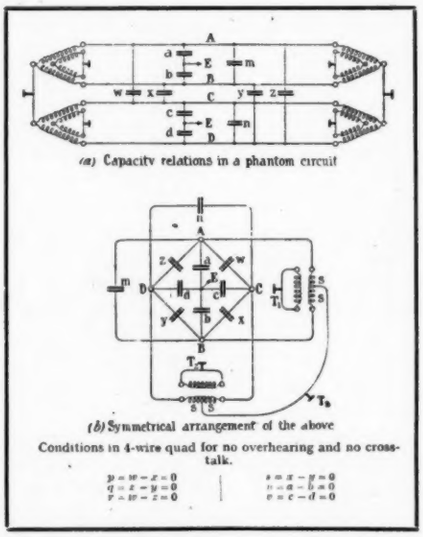


Fig. 11. Relations Between Capacity and Cross-talk.

in cables by the addition of small condensers to the cable conductors at suitable distances (British patent No. 147,013). The condensers employed are made of rolled paper, inserted and sealed in glass tubes, and joined in the cables at loading points. They may be enclosed in separate iron boxes or in loading-coil pots. It is claimed that the device is very successful.

Professor F. Breisig has treated mathematically the problem of overhearing and cross-talk in phantom circuits. He arrives at the conclusion that the overhearing in short lengths of uniform cable such as loading-coil sections with the receiving end insulated, is essentially due to capacity unbalance, and that speech tests may accurately determine its magnitude if a suitably designed artificial cable is used.

Details of such an artificial cable are given. The main feature of the artificial cable is that it is constructed of condensers so as to vary in impedance with frequency in the same way as the actual cable under test, and that its impedance is different from its two ends so as to be the same as that of the circuits under test. One end, for example, may be made the same as the phantom circuit, and the other the same as the side circuit.

When continuously loaded cables require balancing, the process is much more complex than in the case of coil-loaded cables, owing to the fact that the inductance added by the iron wire also requires balancing. This subject is at present receiving study in the British post office.

The difficulty which we are about to consider arises from the circuit arrangement which it has been found advantageous to adopt for telephonic relay working in both side and phantom circuits. It should be explained that when relays were first used in telephone circuits at intermediate points, the relayed voice current was applied to the circuit in bridge, through the differential windings of a transformer, one-half of the windings being connected to the "up" line and the other half to the "down" line. Under these conditions if the "up" and "down" lines are not of equal impedance the electrical action in the relay windings is not differential and the amplifier is actuated, and sends a further current to line.

As a result of this continued action and reaction, the amplifier may give out a loud note. This difficulty may to some extent be minimized by reducing the sensitiveness of the relay, but the amplification of speech is not then so great as it would otherwise be, or, alternatively, if the sensitiveness is not reduced the arrangement is unstable. Further, if the out-of-balance currents sent into the relay are not sufficient to cause howling, they may interfere with the clearness of the amplified speech. If more than one relay is introduced into a circuit the difficulties are increased.

In order to overcome these difficulties, double-relay working was introduced, i. e. the "up" and "down" lines were divided and a separate relay allotted to each, the line in each case being balanced by an artificial network.

In order that the voice currents through

the differential windings of the transformer may be equal, a complex problem requires solution. It will be remembered that the voice includes a large range of tones of different frequencies, varying from, say, 100 to more than 2,000 periods per second. All these tones are simultaneously impressed on the circuit, and the artificial neworks which balance the up and the down lines must be constructed to produce differential action through the transformer windings with all these frequencies simultaneously operating.

Now, the characteristic impedance of the line is generally different for every frequency. The characteristic impedance of a uniform unloaded line is given by formula (6). In the case of a uniformly series-loaded line with the terminal loading coils spaced at a distance of one-half a loading-coil section from the ends of the line, the characteristic impedance Z_{01} is given by the following formula:

$$Z_{01}=Z_0\sqrt{\frac{2Z_0\sinh\theta+Za\,(\cosh\theta+1)}{2Z_0\sinh\theta+Za\,(\cosh\theta-1)}} \quad (12)$$

where θ is the line angle between two loading coils, Z_0 is the characteristic impedance of the unloaded line, and Za the impedance of the loading coil.

In both cases, calculation from these formulæ shows that the characteristic impedance changes with frequency in a smooth, regular way. Notwithstanding the complexity of the physical problem involved in balancing the multiple frequencies of the voice in unloaded or loaded lines, a comparatively simple balancing network can be designed which involves capacity, inductance, and resistance, and which effectively balances the differential transformer and circuit previously referred to if the conditions of formulæ (6) and (12) are fulfilled.

The net work is constructed to balance the circuit for a range of frequencies between 300 and 2,000 periods per second. Filters are necessary to cut out frequencies outside the range for which the circuit is balanced. The result of the application of these devices is that the repeaters used in double-wire working are stable and give good articulation of speech. Detailed examples of the design of balancing networks have been given.

In the case of unloaded, uniform cable lines the line impedance which requires balancing may be taken to be that calculated from formula (6). This involves constructing a network for the given circuit through the range of frequencies first specified. The calculated impedance in this case usually approximates with sufficient accuracy to the measured impedance of that circuit, through the same range of frequencies dealt with. If, however, the circuit is series-loaded the values calculated may differ appreciably from the measured impedances.

Fig. 12 shows a calculated impedance curve of a loaded circuit in dotted lines, and the result of the measured impedance over the same frequency range is given in solid lines. The difference is due to the want of uniformity of the circuit constants. Formula (12) is based on the supposed uniform distribution of the capacity, leakance and resistance throughout the cir-

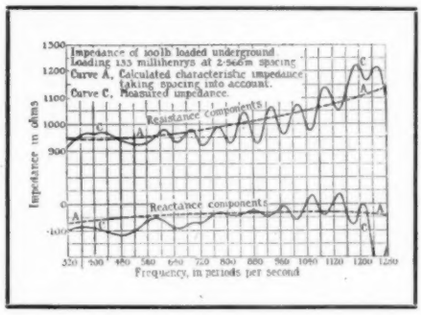

Impedance of 100lb loaded underground
Loading 133 millihenrys at 2-566m spacing
Curve A, Calculated characteristic impedance
taking spacing into account.
Curve C, Measured impedance.
Resistance components
Reactance components
Impedance in ohms
Frequency, in periods per second

Fig. 12. Variation of Impedance with Frequency.

cuit, and also supposes equal inductance and equal spacing of the loading coils.

Where these conditions are departed from, notably as regards uniformity of spacing and variation in inductance and capacity, reflection takes place at points of non-uniformity, and the effect varies with frequency. The result of these variations is shown in Fig. 12. Previous to the introduction of relay working, this phenomenon had comparatively little importance, and it may be mentioned that the circuit which is here taken as an example and illustrated in Fig. 12 was designed for pre-relay conditions, but such a circuit is not sufficiently uniform to give the results required in highly efficient relay working.

It now becomes necessary to specify limits to the permissible variation of (*a*) the spacing distance of the loading coils, (*b*) the inductance of any coil from the mean value of inductance per coil, (*c*) the capacity of any loading-coil section from the mean value of capacity per section.

Experiment shows that leakance and resistance do not cause appreciable difficulty as regards present requirements of network impedance balances. The requirements as regards inductance in this country are that the inductance of any coil must not vary from the mean inductance of each coil by more than 2 per cent. Further, the loading coils must be spaced at intervals which do not vary more than 2 per cent. from the mean spacing distance.

As regards capacity, a restriction of the amount of non-uniformity permissible has not yet been fixed in this country, but experiments made in Great Britain point to the necessity of some limitation, of the same order of accuracy as in the case of the inductance.

Recent extensive experiments made in Germany on the influence of inequalities in the construction of coil-loaded telephone cables on their characteristic impedance by K. W. Wagner and K. Küpfmüller point to the fact that the inductance per section should not vary more than 2 per cent from the mean inductance per section, and that the electrostatic capacity per section should not vary more than 1½ per cent from the mean capacity per section.

When the limitations of capacity, inductance and spacing here outlined are observed, the variations from the calculated curves—such for example as shown by Fig. 12—are materially reduced, the amplitude of the sinuous curve being reduced to negligible proportions.

Before concluding it should be stated that it has not been overlooked that a system of high-frequency telegraphy and telephony has recently been developed in America, largely due to the labors of Major-General G. O. Squier, and also the Western Electric Co., in co-operation with the American Telephone & Telegraph Co. High-frequency circuits are at present regarded, moreover, as supplementing, but not supplanting, methods described.

The study of superposed circuits, used in the widest sense, is one of increasing importance. It is not one for the application of cut-and-dried rules. The problems dealt with are so complex as to require special study of each case in all its aspects. The progress which has been made in recent years has resulted in the replacing, to some extent, of heavy gauge overhead wires of limited electrical stability and carrying capacity, by small loaded and relayed underground circuits of uniform stability and efficiency.

It must not be hastily assumed, however, that the reduction in cost is at all proportionate to the decrease in the weight of copper per mile. The cost of loading such cables is considerable, and to this must be added the cost of providing and maintaining relay stations, with the necessary equipment and staff.

It may be stated as a broad proposition that a loaded circuit of a given transmission efficiency may be provided by a relatively large quantity of copper and a relatively small quantity of loading coils, or, conversely, within known limits, by less copper and more loading coils.

Similarly with relay stations; the more of these we provide, the less the amount of copper and coils which it is necessary to put into the loaded circuits for a given overall transmission efficiency, and vice versa; but there is a point beyond which it is cheaper to provide loaded conductors than relay stations. The ultimate object is to find that combination which for a given number of years gives the required overall efficiency at the most economical cost.

The design and calculation of such a system involves engineering problems of great complexity, as may be seen from the details given in the paper. The ultimate result, however, should be a system of greater efficiency and stability than any provided in the past.

Financial Statements and Reports

Annual Report Shows Lincoln, Neb., Company in Sound Financial Condition, Large Number of Investors Has Improved Its Standing in Community—The St. James, Minn., Company Is Growing—Reports of Other Companies

Frank H. Woods was re-elected president of the Lincoln Telephone & Telegraph Co. of Lincoln, Neb., at the annual meeting of stockholders held January 9. His son, Thomas C. Woods, attorney for the company, was elected vice-president in place of L. E. Hurtz, former general manager who is now engaged in the creamery business. Other officers are: S. H. Burnham, vice-president; C. P. Russell, secretary-treasurer; R. E. Mattison, general manager; W. L. Lemon, auditor; W. E. Bell, commercial superintendent; M. T. Caster, plant superintendent, and R. S. Brewster, traffic superintendent.

The excellent services of R. E. Mattison, general manager, were recognized by his being made a member of the board of directors. George E. Codington, manager at Auburn, was also added to the board. Other members are Commodore N. Beaver, Chris Klem, George J. Woods, Mark W. Woods, Charles Stuart, Charles Mayer, J. M. Bell, Frank H. Woods, L. E. Hurtz, S. H. Burnham and Joseph Grainger.

R. E. Mattison, general manager, in his report to the stockholders, said the business depression seems to be at an end in that section, and that he looks for an increase in business this year. The company's experience had been that telephone traffic always follows general business conditions, but never is affected to the same degree by the swinging of the pendulum. The industry has passed from stages of rapid development, competitive struggle and consolidation to the present period of unified, well-developed, universal service, regulated and supervised by the state.

The company, he said, is in a sound financial condition, with no bills payable and no short-time loans out. The construction budget for 1922 amounted to $622,000. Reserves for depreciation and surplus now reach 22 per cent of the value of the plant. The larger part is invested in plant upon which the public pays no interest, it being held as a guaranty of the integrity of the stockholders' dollar and the permanency of the subscribers' service.

The company's revenues during the year were: Exchange, $1,698,386, an increase of $30 000, and tolls, $684,000, an increase of $4,000. The total was an increase of 1.43 per cent. In spite of the 1,476 increase in the number of stations, the net return of the company was increased $107,000 for the year.

Operative expenses decreased from $751,000 to $675,000, and maintenance from $449,000 to $436,000, while taxes increased $10,000, and are now $163,000. The company had $610,000 left for depreciation reserve and surplus. Stations in service now number 67,481, as compared with: 1916, 52,205; 1917, 55,633; 1918, 57,236; 1919, 61,562; 1920, 65,384; 1921, 66,005.

The company has total assets of $10,768,709, made up of: Physical property, $9,313,071; investments, $199,135; material and supplies, $343,772; cash and deposits, $599,321; current receivables, $313,410. The liabilities are: Capital stock, $6,784,113; funded debt, bonds due 1946, $1,500,000; current payables, $357,411; reserve for depreciation, $1,755,258; other reserves, $82,417; surplus, $289,510.

The common stock of the company went to an 8 per cent basis on January 1, and the preferred stock was also given an added per cent, to 6 per cent. The company's construction and building program for this year is fully financed and no additional securities are being offered for subscription. This contemplates the expenditure of $654,000, which will result in net additions to plant of $366,000.

The company has had no increases in rates since July, 1919, except in the case of five small exchanges recently purchased and rebuilt, the level of whose rates have been brought to standard. On January 1 the company obtained a revision of toll rates that will increase revenues 2 per cent.

"Your officers believe," said Mr. Mattison, "that our company operates on a lower schedule of rates than any other Class A company in the United States. It is not to be expected that telephone rates can be reduced following the slight reductions in the cost of telephone materials and supplies that have taken place. These items form only a small percentage of the cost of construction. Their principal influence is reflected in the cost of construction.

"We did not make war profits. Service was furnished at cost during the war period, the same as at present. Our wage scale was below normal during the war, and has merely been raised to a fair rate. Our employes did not receive the percentage of advance that was paid in many other industries, and we cannot in fairness at this time expect to reduce them."

The company is now earning 6 per cent on its plant value for depreciation purposes. The average cost of capital to the company during the past year was 6.54 per cent. The company is just now paying its 56th consecutive dividend.

The common stock of the company is held by 1,924 persons, of whom 724 are women, located principally in the territory served. The shares are so widely distributed that it would require the combined stock of 161 of the largest stockholders to constitute a majority. The largest stockholder owns less than 2 per cent of the issue.

This wide distribution of stock, Mr. Mattison said, and the fact that the company is owned by so many small investors, have been elements of great strength. It has increased the standing of the corporation in both the field of investors and with the public, since it is in truth a big democratic organization owned by a large number of persons and is operated under state supervision. There are 266 employes holding $144,600 worth of stock.

During 1922 the employes' benefit fund expended $16,711 in accident, sick disability and death benefits. There were 129 cases of disability handled. The total number of accidents was 191, as compared with 113 in 1921, but the loss of time was reduced from 1,487 days in 1921 to 826 in 1922.

During the year the company modified its plan of organization. The three functional district managers in each of four districts have been replaced by one district manager in each of five districts. This has reduced the supervisory expense and has met with general approval, Mr. Mattison says. During the year Thomas C. Woods was added to the executive staff as attorney.

Mr. Mattison appended to his report a table which shows the percentage of the total investment represented by each classification of property as follows:

Class of Property.	Per cent to total value.
Exchange pole lines	19.13
Aerial cable	8.59
Exchange aerial wire	11.39
Underground conduit	2.27
Underground cable	3.13
Toll pole lines	11.24
Toll aerial wire	11.28
Land	0.91
Buildings	5.46
Central office equipment	12.42
Station equipment	14.03
Other plant	0.15
	100.00

The following table shows how each dollar received for telephone service is expended:

Salaries and wages	$0.525
Material	.155

Interest and investment	.160
Taxes	.060
Interest on bonds	.035
Transportation	.020
Directories	.010
Miscellaneous	.010
Lease on plant and instruments	.010
Insurance	.005
Uncollectible accounts	.005
Surplus reserve	.005
Total	$1.00

St. James, Minn., Company Reports on Operations for 1922.

The eighteenth annual report of the St. James Telephone Co., of St. James, Minn., shows gross operating revenues of $20,409 and net revenues of $4,838 for the year ended December 31.

Dividends amounting to practically $4,000 were paid during the year, and notes payable were reduced by $2,500.

The balance sheet contains the following figures:

Assets.

Cost of plant and equipment	$63,503
Cash on hand	2,038
Due from subscribers	1,743
Accounts receivable	17
Material and supplies	377
	$67,678

Liabilities.

Capital stock issued	$49,475
Notes payable	4,000
Other accrued liabilities unpaid	612
Depreciation reserve	8,164
Service charges paid in advance	50
Profit and loss account	5,377
	$67,678

The income account follows:

Total operating revenues	$20,409
Total operating expenses	15,571
Net operating revenues	$ 4,838
Taxes	908
Operating income, gross	$ 3,930
Interest deductions	466
Net income	$ 3,464
Dividends declared and paid	3,958
Debit balance transferred to profit and loss account	$ 494

The St. James company serves a total of 959 subscribers—546 local and 413 rural. It has 243 miles of pole line and two and one-half miles of cable.

Statement Shows Keystone Financial Improvement Continuing.

Higher gross earnings and lower operating expenses during December gave the Keystone Telephone Co., of Philadelphia, Pa., higher net earnings than for December 1921. The balance available for dividends, surplus and reserve also showed an increase—to the extent of approximately $16,000.

The comparative figures for the year likewise reflect an improving condition, last year's balance being about $67,000 more than for the previous year. While the gross earnings were a trifle lower in 1922 than in 1921, the net earnings were $92,600 higher. Operating expenses dropped $128,000 below those for 1921.

The following figures compare conditions for the two years:

	For Month December 31, 1922.	Ended Year Previous.
Gross earnings	$ 168,833	$ 164,277
Operating expenses and taxes	78,692	89,613
Net earnings	$ 90,141	$ 74,664
Less interest charges	$ 42,442	$ 42,766
Balance available for dividends, surplus and reserve	$ 47,699	$ 31,898

	For 12 Months December 31, 1922.	Ended Year Previous.
Gross earnings	$1,703,274	$1,739,043
Operating expenses and taxes	977,681	1,06,106
Net earnings	$ 725,593	$ 632,937
Less interest charges	$ 501,235	$ 475,809
Balance available for dividends, surplus and reserve	$ 224,358	$ 157,128

Northwestern Bell Reports Increased Revenues for 11 Months.

The Northwestern Bell Telephone Co. has filed with the Nebraska State Railway Commission its statement of business for the first 11 months of 1922. This covers the states of Nebraska, Iowa, Minnesota and the Dakotas.

It shows the company has assets of $98,979,000, an increase of $2,000,000 during the year. The revenues totaled $20,707,000, an increase of $1,088,000. Three-tenths of the total represents exchange revenues and three-tenths toll. Total expenses for the same period were $16,810,000, a decrease of $63,987. The chief saving was in operators' expenses, which decreased $407,148, or .38 per cent. The total expenses decreased 4.39 per cent.

During the eleven months of 1922 the company earned 6.31 per cent on its investment, as compared with 4.02 per cent last year. During November the return was 8.52 per cent.

The net earnings for the 11 months are $4,742,000, of which $2,305,000 went for interest, leaving a balance of $2,437,000 for dividends, which at the average rate will be $1,896,000 for the period, leaving undivided profits of $540,000, which is about normal.

The company operates in those states 490,461 stations of its own, and connects with 923,211, a total of 1,413,672. During the 11 months the company gained in stations 13,470, but lost 1,908 connections, leaving a net gain of 11,562.

For Nebraska an entirely different showing is made. There, with a net gain in gross revenues of $82,000, the company reports a loss of $60,586 on net revenues. Part of this is due to a decrease in toll revenues, but the larger part to an increase of $131,610 in the depreciation reserve, due almost entirely to the installation of machine switching in Omaha. Maintenance also increased $97,545; commercial expenses, $6,584; general expenses, $8,623, while a big saving was made in the wages of operators, $247,750.

The assets of the company in Nebraska are $18,400,000, an increase for 11 months of $294,000. The total revenues for that period were $4,311,000, of which two-thirds was exchange and one-third toll. Expenses for the period were $3,751,000, an increase of $54,149, or 1.46 per cent. This shows expenses in the Nebraska district increased, while in the whole territory they decreased.

The net earnings for dividend purposes are $619,985. The company says it has earned, in the 11 months, but 3.68 per cent, as compared with 4.02 per cent for the same period in 1921.

Nebraska Convention Next Month at Lincoln.

President Bruce Brown of the Nebraska Telephone Association has issued a call for the annual convention to be held at the Lincoln Hotel in Lincoln on February 20, 21 and 22.

Mr. Brown is very anxious to secure the attendance of representatives of as many of the smaller telephone companies of the state as possible. The directors have held a number of district meetings during the year for the purpose of enlisting the interest of the smaller organizations in the work and have had unusual success.

President Brown says that at the state convention some very important business of special interest to the smaller companies will be considered, and he believes it would pay all of them to instruct their managers to attend at the expense of the companies.

The program is now being arranged

Dates Announced for Convention of Kansas Association.

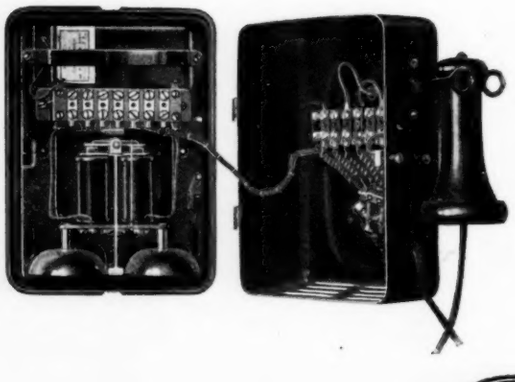
The dates decided upon for the annual convention of the Kansas Independent Telephone Association are March 6, 7 and 8. It will be held in Ottawa at the Nelson Hotel.

Secretary L. M. Kraege announces that the program which is being prepared covers several matters of importance and topics of general interest to telephone managers, officers, directors, wire chiefs and other telephone folk. Special attention is being given to the school for operators, which will be one of the best ever held.

It is Mr. Kraege's purpose—in announcing the dates at this time—to have as many of the association members as possible make definite plans to attend and to invite neighbor telephone people who are not members.

The Interior of the Desk Stand Base is neat and clean, and all terminals are accessible.

Loosen one screw, and the entire hook and spring assembly may be lifted for inspection or adjustment.



The Wall Telephone assembly is neat and compact and every part and every terminal easily accessible.

Perfected Interior Construction

Some Inside Facts About the New Type 21 Telephones

Those who have had the opportunity of examining Automatic Electric Company's new Type 21 wall and desk telephones are unanimous in declaring that their interior mechanical design marks a distinct advance in the science of telephone construction.

The simplicity and accessibility of the parts, their sturdiness of construction and assembly are a revelation to all who see them. At the same time they are complete in every detail.

Some of the important mechanical features of the Type 21 Wall and Desk instruments are illustrated on the opposite page. We can illustrate but a few of them, but there are others equally valuable and pleasing.

We suggest you write for fully descriptive literature or, better still, for samples. Remember also that these telephones are for automatic or manual use, and may be furnished with or without dials, or with dial blanks for present manual and future automatic operation.

Automatic Electric Company

FACTORY AND GENERAL OFFICES: CHICAGO, ILLINOIS

BRANCH OFFICES IN ALL PRINCIPAL CITIES

ASSOCIATED COMPANIES

INTERNATIONAL TELEPHONE SALES AND ENGINEERING CORPORATION, New York

International Automatic Telephone Company, Ltd., London.

Compagnie Francaise pour l'Exploitation des Procédés Thomson-Houston Paris.

Automatic Telephone Mfg. Co., Ltd., Liverpool

Automatic Telephones, Australasia, Ltd., Sydney

What Is Your Company Doing?

Chats About Company Doings

By Stanley R. Edwards.

In the December 24, 1922, issue of the Erie Dispatch-Herald, Erie, Pa., considerably over a half a page with display heads was given to articles telling about a "quarter century" of telephone service furnished by the Mutual Telephone Co.

Photographs of General Manager John Z. Miller, who installed the first exchange in 1897 and has been continuously with the company since; former Mayor Wm. Hardwick, the company's first president; W. J. Sands, first treasurer; and seven of the other organizers of the company, were published.

Another interesting part of the story was a reproduction under the heading, "These are names you'll recognize," of the first directory list of subscribers.

The article told of the steps taken in 1896 and 1897 to organize the company as set forth in the official minutes in the records of the company.

In speaking of General Manager Miller the article says that when he graduated from Lehigh University in 1891 his thesis concerned an original telephone transmitter which he had perfected. Before his college days "J. Z." worked with the genius, Daniel Drawbaugh, held by many to have been the inventor of the telephone.

Drawbaugh's shop was at Eberley's Mills, near Harrisburg, and it was there he produced a "talking machine" in 1873. Bell announced his discovery in 1876 and a bitter controversy was carried into the supreme court of the United States.

Drawbaugh produced witnesses who had used his apparatus in 1876, and finally the decision went to Bell, four justices voting in his favor against three for Drawbaugh. Two others were absent from the bench.

"More than 25 years ago I talked over a wireless telephone which carried for three miles," "J. Z." reminisced. "It was in old Dan's little shop."

Drawbaugh also invented a water turbine to develop power, but it was used only for operating an organ in an old Harrisburg church. He was a genius, Mr. Miller said, but he lacked the initiative to push his inventions to the fore. He produced a buckle making machine and more wonderful, a lock that opened to the sound of a human voice when it pronounced the keynote syllables. It was too delicate for commercial use, but has been demonstrated frequently in laboratory work since.

Accordingly, it was in such an atmosphere that "J. Z." studied before he went to Erie. The story of the progress of the company under his management, as related, made an exceptionally interesting story.

THE ERIE DISPATCH-HERALD: SUNDAY, DECEMBER 31, 1922
PAGE THREE
Erie 200,000 by 1930
4 Out of 5 Use the Mutual
Twenty-Five Years of Public Service
A QUARTER of a century ago the Mutual Telephone Company came into existence to meet a public need. It started with a single switchboard of 400 line capacity.
SINCE that time, there has been a consistent growth. Not one month in all those years showed a decrease in the number of Mutual Telephones in service. On the other hand, the increase was so marked that now more than "Four out of five use the Mutual" and the number of telephones has been increased to 15,000.
WE are proud of this record and proud of Erie—glad that we have become an integral part of it. Our greatest ambition is to grow with Erie and to give it continued service.
The Mutual Telephone Company

Half Page Advertisement Which Shows How Telephone Company's Growth Is Linked With That of the City.

January 1 the Citizens Telephone Co., of Delaware, Ohio, celebrated the 100th consecutive payment of quarterly dividends and the completion of 25 years of service marked by rapid and long strides in progress and development. Honoring the occasion, the stockholders were called together at the company's building to celebrate at a reception arranged by the directors.

The 25 years have seen the company develop from a grounded return system in 1897 with a switchboard having a maximum capacity of 300 lines, to an automatic common battery exchange of 2,191 telephones in Delaware and 1,113 telephones out in the county with manual boards at Cheshire, Radnor, Kilbourne and Lewis Center.

When the Delaware exchange was placed in operation the Bell had about 150 subscribers with a single telephone at Warrensburg. Warrensburg wanted an exchange and made overtures to both companies. The Bell's terms were considered out of the question, so the offer of the Citizens' company of a guarantee of 50 subscribers was immediately taken up and Warrensburg became the first extension of the Independent company outside of the Delaware city limits.

The lines were made metallic in 1900 and in 1902 a common battery switchboard with a capacity of 1,200 lines was installed. The company's capital stock was increased to $100,000 at this time.

During these years the Citizens' Telephone Co. was spreading out into the county and establishing sub-exchanges. Its business within the city was expanding, thus giving the Bell company a real fight for existence. Late in 1909 overtures between the two companies began, looking toward the purchasing of the Bell interests by the local Independents. In 1910 the deal was consummated and the Citizens' company bought the Bell for approximately $8,000 after the Bell directors offered to sell at $10,000, a figure set by the state utilities commission after an appraisement of the property.

About this time the ultimate capacity of the switchboard was increased to 1,800 lines. In 1919 the Delaware exchange was moved into a handsome new building and the system cut over to automatic operation.

The capital stock was increased to $250,000, as compared with $20,000 at the beginning in 1897. There are now 42 employes on the company's payroll. The annual income is $92,000, as compared with less than $10,000 in 1900. The total value of the property, including the central exchange in Delaware and the sub-exchanges, is $292,000.

W. M. Heseltine is today the only director of the company who was one of the members of the first board in 1897 and he was the third president of the company.

The local newspaper devoted front page space with two-column heads to the story of the company's inception and growth and the celebration marking its 25th anniversary.

Miss Jessie Moore, chief operator of the Albia Home Telephone Co., Albia, Iowa, who started with the company at the same time as did the late Ernest J. Renz, for-

mer manager, at Christmas time made an appeal to the operators for continued loyalty to the standards of service built up by Mr. Renz.

The operators, many of whom have several years' service records, are very loyal and consequently the patrons do not know of the great gap caused by the death of Mr. Renz last month. Mr. Renz was rarely absent from duty and his sudden death was a great shock to the operating force.

In her letter to the operators, Miss Moore said in part:

"The greatest monument to Mr. Renz' memory will be to keep up the good service that has been established by his years of labor. It cannot be done by *one* operator, or by the chief operator. Each individual operator, as she takes her place at the switchboard, must keep in mind the instructions from one who gave the best of his life to give good service to the public.

Although the public may not seem to appreciate our service at times, we are here to do our best. Remeber, *courtesy* was the one great thing always in the mind of Mr. Renz when meeting the public. Let us each one keep fresh in our memory the one desire of our late loyal manager—good service.

Each operator knows what it means to follow the rules that mean good service. It is not necessary for me to give you the rules, but just say to you, 'let us meet the public with a smile in our voices.' It is not always easy to keep smiling when some cross subscriber does not understand the conditions, but a smile in our voices will help to hold his confidence."

With the heading more than one inch in height, "A New Year's Resolution," the Mountain States Telephone & Telegraph Co., using a full page newspaper advertisement, showed a scroll and a pen within a hand, the top of the scroll captioned "1923," and then:

"I know that the profits of my business depend upon the prompt turnover of my stock.

I know the time I lose in negotiations, in sales, in delivery, routine and in the general movement of my goods represents an actual waste of dollars. The time I lose is as valuable as the time I use.

I know that I must do all my business in the quickest possible time.

I know the telephone is the quickest and most satisfactory medium available to me.

Therefore, I Resolve

To use the telephone more at home and abroad.

To close dealers o'er the telephone that otherwise might require a personal visit or time wasting exchange of letters.

To keep my long distance telephone costs down by using the station-to-station rates whenever possible; because anyone who answers my long distance calls can usually handle the matter or promptly summon another who can."

Signed————————

To make this resolution profitable and helpful, we pledge our utmost effort.

THE MOUNTAIN STATES TELEPHONE & TELEGRAPH CO."

Out in California telephone companies are having trouble due to "radio bugs" anchoring their antennae to telephone poles. District Manager Earl S. Morrow, of the Pacific Telephone & Telegraph Co. at Santa Ana, recently had the following readable item in the local newspaper under the heading, "Phone Systems Disrupted by Radio Wires":

"Radio bugs, are you hitching your wire equipment to Mr. Earl S. Morrow's telephone poles?

"It's no joke, he says, because it plays heck with his telephone system. Listen to him explain the matter in your own language:

'Mr. Radio Bug, this is Mr. Morrow, district manager of the Pacific Telephone and Telegraph Co.:

'The encroachment of radio antennae on telephone poles is causing more grief than the radio fan supposes, and the telephone people would appreciate the exercise of a little restraint on the part of the enthusiastic amateur antennae installer.

'A grieved telephone lineman has expressed the thought somewhat pithily in his statement to the effect that his work has always been hard enough without the added duty of cutting away a group of antennae every time he has to ascend a pole. While he might ascend a pole without much trouble, being able to see these attachments, his descent is made hazardous because, not being able to see what is below him, his feet may run afoul of an unexpected wire and a bad fall result.

'The same lineman points out that the attachment of wires other than those properly installed on poles by the company to give its patrons service, is a possible cause of service interruption and a hazard to himself and others.

'Antennae falling on pedestrians or across telephone and electric light and power wires will cause a lot of trouble, and the telephone company has been forced to take the stand that attachments of this nature to their poles institute a serious menace and requests the coöperation of radio enthusiasts in doing away with this hazard.'"

Wire Chief Frank West and Manager F. Trautwein of the Morrison Telephone Co., Morrison, Ill., are now at work on a plan whereby the company will be able to give greatly improved service in the near future, should a fire develop in the rural communities.

The plan is one requiring a vast amount of detail work, but once completed is expected to prove wonderfully serviceable. Approximately 800 telephones are concerned. When the plan is in operation all that will be necessary for any farmer having a fire is to call "Central," give the number of his telephone, and the operator will do the rest.

Upon learning the number of the party calling, the operator will refer to a book in which all telephones of subscribers in the neighborhood are listed. This results in notice being sent to from 20 to 30 other persons without further effort on the part of the subscriber.

The new system will prove advantageous in that the lack of information of the neighborhood from which the alarm is turned in will not have a deleterious effect in summoning help. The various moves made each spring will not change the workings of the system, either, for the calling will all be done by number and not by name.

In the city of Morrison, upon an alarm being turned into the office, each operator has a certain number of the firemen whom she is to call. If four girls are working, each would take one-fourth of the number; if three, one-third, and so on. Of course, under normal conditions, a night alarm means that there is only one operator who must take the responsibility.

Kentucky utilities for the past year or two have worked hard for public sympathy and good will, and especially that of the press. Of late the utilities have done a considerable amount of advertising, along good will lines and in efforts to secure local investors in their securities, which results in better backing by the public.

Lately some coöperative advertising, on the "Public Servant," and "Obedient Servant," has appeared in the press, in which the Louisville Home Telephone Co., Louisville Railway Co. and Louisville Gas & Electric Co. have coöperated.

The national commission of the Associated Advertising Clubs of the World, at a recent meeting in Chicago, admitted to membership the Public Utilities Advertising Association. Members of the association include advertising men of the electric light and power, manufactured gas, telephone and electric railway industries, representatives of the various state committees on public utility information and representatives of the national associations of various branches of utility industry.

The object of the Public Utilities Advertising Association is to promote the use of, and make better, the advertising of the utilities of the country. The Public Utilities Advertising Association will go to the annual convention of the Associated Advertising Clubs of the World at Atlantic City in June with a complete program of its own and will also participate in the general sessions of the convention.

Program for Annual Convention of Minnesota Association.

The program for the 14th annual convention of the Minnesota Telephone Association—which will be held January 23, 24 and 25 at the Ryan Hotel, in St. Paul—has been completed.

Secretary J. C. Crowley, Jr., announces that the morning of the first day will be given over to registration, payment of dues, and distribution of badges—all of which will take place on the second floor. The exhibits will be displayed on the same floor and will be open for inspection beginning with Tuesday morning.

All sessions will be held in the Marquette room on the balcony.

The program proper follows:

TUESDAY, JANUARY 23, 2:00 P. M.

President's Address, by Jay Greaves, Glencoe, president of McLeod County Telephone Co.

"Public Liability Insurance," by Walter L. Clark.

"Radio—Some Present Aspects of Radio Communication and Some of Its Possibilities," by C. M. Jansky, professor of electrical engineering, University of Minnesota.

Appointment of committees and other business.

WEDNESDAY, JANUARY 24, 10:00 A. M.

"Collection Methods and Policies," by D. W. Gretorex, of Blue Earth, vice-president and general manager, Blue Earth Valley Telephone Co.

"Coöperation Between the State Highway Department and the Telephone Companies," by C. M. Babcock, state highway commissioner.

"Station and Plant Protection," by George W. Rodormer, Reliable Electric Co., Chicago.

WEDNESDAY, 2:00 P. M.

Business session—reports of finance and auditing committees.

Election of directors.

First aid demonstration by C. Snyder, T. Terusse, A. Johnson, L. D. Lancaster, J. Beckstrom, C. Jacquinet, H. A. Sandt, A. L. Scott, J. Fordham, W. Henry, C. Kachelhoffer, and W. H. Watts.

WEDNESDAY, 6:30 P. M.

Banquet and entertainment.

THURSDAY, 10:00 A. M.

Report of inductive interference committee, by D. M. Neill, of Red Wing.

"Inductive Interference," by Norman Kingsley.

Reports of committees and other business.

Indiana Public Utility Men to Meet Next Week.

The third annual meeting of the Indiana Public Utilities Association, comprising the telephone, traction, electric, gas and water utilities of the state, will be held in Indianapolis on Thursday, January 25. Forenoon and afternoon business sessions are on the program with a luncheon meeting and a banquet as features.

Governor Warren T. McCray will address the luncheon meeting. Mayor Lew Shank of Indianapolis, is expected to give the address of welcome. Charles L. Henry, the pioneer interurban man, who is president of the association, will preside at all sessions, including the banquet in the evening.

Edward N. Hurley, of Chicago, former chairman of the Federal Trade Commission, and chairman of the United States shipping board during the war, is to deliver the chief address at the banquet. His subject will be: "The Obligation of the Public to Utilities."

As in past years, the public will be invited to attend the meetings. City and state officials, and members of the general assembly will be invited to attend and hear the discussions of the various phases of the utility business.

Bell Pioneer Telephone Men Hold Meeting in Denver, Colo.

The Telephone Pioneers of America, Chapter 8, held a meeting and banquet in Denver, Colo., on January 8, at which there were present 56 members who have been in the Bell service for more than 20 years.

Benjamin S. Read, president of the Mountain States Telephone & Telegraph Co., was the principal speaker of the evening, taking as his subject, "Looking Forward." He said that within the next 10 years the Mountain States company will build a $1,500,000 building; that in it there will be equipment worth more than $4,500,000; and that automatic equipment will play its part.

Mr. Read also said that within a few years telephone communication will be unhampered by storms, because all wires between stations will be underground. The cable, he said, will be so perfected as to make the underground system the cheapest.

E. M. Burgess, vice-president of the company, presented some reminiscences in "Looking Backward." He told of his first work with the company in 1880, as a switchboard operator at a salary of $20 a month, and how he had watched the company grow from a total of 500 telephones to more than 60,000.

The following officers were elected: A. S. Peters, president; C. A. Wiswall, vice-president; W. H. Bellard, secretary; and W. D. Wynkoff, treasurer.

Plan to Standardize Radio Is Agreed Upon by 40 Societies.

A broad program of radio standardization was agreed upon at a meeting in New York, January 12, of representatives of 40 radio trade associations and national engineering and scientific societies. The meeting was held at the Engineer Societies Building.

Resolutions were adopted providing:

1. That standards for radio apparatus and service should be formulated.

2. That a broadly representative national committee of radio standardization should be formed under the leadership of the Institute of Electrical Engineers, under the procedure of the American Engineering Standards Committee.

Commissions, Courts and Councils

Discussion and Rulings of State Bodies Having Supervision Over Telephone Companies—Decisions of Courts in Matters of Interest to Public Utilities and Actions of City Councils Relative to Franchise, Rates and Service

Northwestern Bell's Nebraska Case Before Federal Judge.

Argument was heard January 9 by Judge Munger, in federal court, on the motion of the Nebraska State Railway Commission for the dismissal of the injunction filed by the Northwestern Bell Telephone Co., to restrain the enforcement of the order of November 4, issued by that body, and which, among other things, reduced exchange rentals 10 per cent.

The commission maintained that the company could not go into a court of equity until it had exhausted its remedy at law, and that the provision of the statutes, which permits any common carrier that is aggrieved by reason of a commission order going directly into the state supreme court, provides this remedy.

The company contended that inasmuch as the state supreme court is restricted by the constitution to exercise only judicial powers and cannot act legislatively, as is necessary in rate making, it had the right to choose whatever court is pleased to determine judicially the question of whether the commission's order results in confiscation of property.

For the commission it was pointed out that in ordering a physical connection demanded some years ago by the Hooper Telephone Co., the state supreme court, while disclaiming the power to legislate, actually did legislate. It was also shown that in the Omaha street railway case the supreme court had practically fixed the

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rates by telling the commission that the company was entitled to an increase and suggesting what would be a proper rate.

Judge Munger said that it was a close legal question and that he would take time to decide it. He said that the courts have been appealed to so often in recent years by public service corporations, which claimed to be held down to rates that are inadequate, that they had come very close to the point of rate making in order to preserve the carriers from serious financial inquiry.

The federal circuit court of appeals, however, has very emphatically said that the sole question for a trial court to determine is whether a rate is confiscatory or not and that they must not seek to legislate by saying what is an adequate rate.

The Northwestern Bell company has until February 4 to appeal to the supreme court if its case is thrown out of the federal court. As pending the determination of such an appeal, the rates fixed by the commission become effective, it contends that this inflicts an irreparable financial injury.

City Cuts Reduced Rate Schedule Offered by Bell Company.

Instead of the rate reductions of 50 cents a month on business stations and 25 cents on residence stations in Fort Smith, Ark., proposed some time ago by the Southwestern Bell Telephone Co., the city on January 4 substituted a schedule making reductions of $1 and 35 cents respectively for these classes.

At first it was believed by Mayor Bourland that the council would accept the schedule offered by the company, but after a conference between the mayor and the city commissioners more drastic decreases were made.

The base rates which the company had been using since January 1, 1921, were $7 for business and $3.25 for residence telephones. It was stated at the conference that there are about 3,800 residence and 1,000 business stations in Fort Smith.

Santa Paula, Calif., Company to Issue $7,000 in Bonds.

Authority to issue $7,000 face value of its 5 per cent bonds was granted the Santa Paula Home Telephone Co., of Santa Paula, by the California Railroad Commission on January 9.

The bonds are to be sold for not less than 85 per cent of their face value plus accrued interest, and the proceeds are to be applied toward part payment of indebtedness incurred for construction.

Indiana Commission Told About Western Electric Contract.

The relations existing among the American Telephone & Telegraph Co., the Western Electric Co. and the 26 Bell companies in the United States, known as "associated companies," were brought out extensively in the course of the testimony of Edward V. Cox, assistant vice-president and supply auditor of the A. T. & T. Co., before the Indiana Public Service Commission in the Indiana Bell Telephone Co. consolidated rate case, in Indianapolis, which was adjourned January 8 to be resumed probably February 5.

Mr. Cox was put on the stand by the Indiana Bell to show that the standard supply contract between the Indiana Bell and the Western Electric Co. is advantageous to the Indiana Bell. He admitted there was no competitive bidding under this arrangement, but he submitted that the Western Electric Co. supplies telephone apparatus and lead-covered cable made by it and supplies other equipment as a purchasing agent at lower than open market prices.

The public service commission is going into the standard supply contract and other relationships to ascertain whether under such conditions the Indiana Bell fares as well as it might. Among the inter-relations and the effects of them brought out are the following:

The American Telephone & Telegraph Co. owns 98 per cent of the stock of the Indiana Bell and owns more than a majority of the stock of the Western Electric.

The Indiana Bell, controlled by the A. T. & T. Co., entered into a standard supply contract with the Western Electric, controlled by the A. T. & T. Two corporate children of the A. T. & T. entered into a contract with each other, presumably at the dictation of the parent A. T. & T.

C. G. Dubois, president of the Western Electric, formerly was controller of the A. T. & T. President Thayer of the A. T. & T. formerly was president of the Western Electric.

The A. T. & T. laboratories in New York City are in a Western Electric building, and Western Electric men conduct experiments in the laboratory under direction of the engineers of the A. T. & T. general staff. The A. T. & T. pays the bills of the Western Electric for laboratory work.

The Western Electric makes transmitters, receivers and induction coils for the A. T. & T., and the latter leases them to associated companies (Bell subsidiaries). On the use of these instruments is based partly the arrangements by which the subsidiaries, including the Indiana Bell, pay annually 4½ per cent of gross revenues to the A. T. & T. The remainder of the basis of payments is for services of the A. T. & T. general staff.

The Western Electric also makes other telephone apparatus and lead-covered cable which it sells to the subsidiaries of the A. T. & T. under what is known as the standard supply contract. Under this contract it also buys materials and equipment for the subsidiaries and receives a percentage for service.

The cost plus plan is used for articles manufactured by the Western Electric and sold to the Bell subsidiaries; for example, lead-covered cable. The cost of manufacturing it is determined and 8 per cent is added to the price charged the Bell subsidaries. Mr. Cox exhibited a chart about five feet long, presenting the method of computing about 200 elements in the cost of making lead-covered cable.

The Indiana Bell and other subsidiaries of the A. T. & T. buy under the contract largely what are known as specified materials, which Mr. Cox said are generally better than the open market or commercial materials.

"You say there are 26 associated companies," said Mr. VanNuys. "How many go outside (of the Western Electric) in the purchase of apparatus than the Western Electric markets?"

"Practically none," said Mr. Cox, who added that there are some exceptions where the Bell companies buy Independents and go outside to buy apparatus for the former Independent exchanges to fit the equipment.

"And still the section is put in the contract in regard to the right to buy outside as one of the valuable conditions?" Mr. VanNuys asked.

"It is," said Mr. Cox.

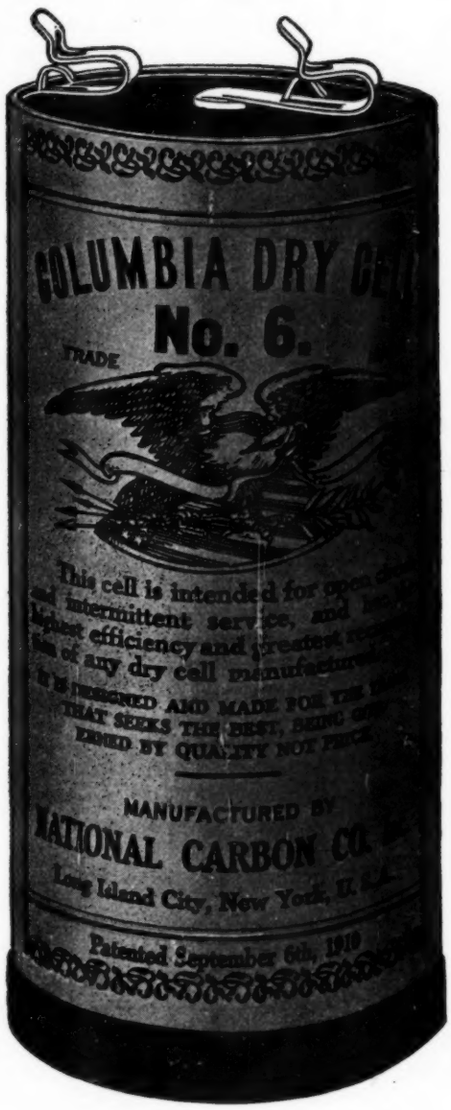
Mr. VanNuy's point was that the section in practical effect has no value inasmuch as the policies of the Bell subsidiaries are controlled by the A. T. & T., owner of the stock of the subsidiaries, and it is to the advantage of the A. T. & T., as owner of Western Electric stock, to maintain a policy of having the Bell subsidiaries purchase from the Western Electric.

Mr. Cox thought one of the advantages of the Western Electric was inspection, in purchasing work. He said there were "experts in every line," who could obtain in advance what market prices were likely to be and with this knowledge available, he said the Western Electric could buy more cheaply, especially since it buys in large quantities.

He said furniture, formerly one of the articles the associated companies bought in the open market, would be supplied through the Western Electric for it recently had made an arrangement with a company that has warehouses in various parts of the country.

From the standard supply contract with the Indiana Bell, it appeared that the Western Electric buys paper and adds 2 per cent to make the price charged to the Indiana Bell. Mr. Cox said the saving to the Indiana Bell was five times the 2 per cent.

Mr. VanNuys asked him if he knew about the paper and printing establishments of Indiana and their prices. The witness said he did not. Mr. VanNuys then asked him how he knew the contract was advantageous. The witness said he based his remark on experiences he had had in other sections of the country.



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The witness said the Missouri Bell for nine months had gone outside to buy instead of buying of the Western Electric, and then went back to the Western Electric, having lost an estimated amount of $8,000. Mr. VanNuys developed that what Mr. Cox said about the Missouri Bell virtually was all hearsay.

Mr. Cox testified to the contents of a number of exhibits that were introduced in evidence at the hearing.

In sum, his testimony was that the Indiana Bell gets telephone apparatus and lead-covered cable cheaper from the Western Electric Co. as a result of what is known as the "standard supply contract" than it could get it from competing or Independent manufacturers.

Some of the exhibits went to the extent of seeking to demonstrate that the Western Electric Co., with a system of warehouses scattered throughout the country, performs valuable service in coming to the quick relief of Bell companies by providing emergency supplies quickly after a storm or other disaster that interrupts telephone service.

He testified about a number of Independent telephone companies the A. T. & T. or Bell interests had bought. He said the prices these companies had paid as Independents were compared with prices they would have paid to the Western Electric under the standard supply contract, and the showing was that the Western Electric prices were less than the prices actually paid by those companies when they were Independents.

Mr. Cox said it was his duty as supply contract auditor to see that the Western Electric was living up to its contracts with the associated companies, including the Indiana Bell. Lead cable, he said, was bought of the Western Electric on a cost plus basis, meaning the cost of manufacture, plus 8 per cent.

Before the standard supply contract was made between associated companies and the Western Electric, he said, the associated companies had been buying practically all of their equipment from the Western Electric. Formerly, he said, the Indiana Bell and other associated companies had a purchasing staff and owned their own warehouses. He said it was found desirable to do away with the central warehouse for each associated company and let the Western Electric warehouses store the supplies. This, he said, prevented duplication and was a more economical arrangement.

Excluding the business done with the associated companies, Mr. Cox said the Western Electric Co. does about 20 per cent of the telephone equipment business the country over and about 40 per cent of the lead cable business.

In one exhibit he showed the prices paid for a list of 31 articles on the open market in 1919 to the Western Electric and prices charged by two Independent manufacturers. Counting the Western Electric prices at 100, he said one competing manufacturer's prices were 98 and another 99.

The Western Electric prices to associated companies are less than Western Electric prices on the open market, according to comparisons submitted.

This and other testimony along the same line was designed to show that the Indiana Bell has not been paying exorbitant prices to the Western Electric. The commission is going into the "standard supply contract" arrangement because the contract, it is asserted, was not made at arm's length, the Indiana Bell and Western Electric both being controlled by the American Telephone & Telegraph Co.

Only One Company in Gibson County, Ind., Now.

The Princeton Telephone Co. has taken over the Oakland City and Indiana Bell telephone properties in Gibson county, Ind. A new rate schedule for the combined service will be made following a hearing January 19, at Princeton, before Carl Wilde, director of service of the Indiana public service commission.

The exchanges of Princeton, Oakland City, Ft. Branch and Patoka are now controlled by the Princeton Telephone Co. The Bell long distance station in Princeton will be transferred to the main office. Authorization for acquiring the properties was made by the Interstate Commerce Commission.

The value of the Oakland City company was placed at $15,981 and the Indiana Bell properties at $54,914. The Princeton company will effect its purchase of these properties by exchange of its own stock with the stockholders of the other companies.

The purchase of the two companies by a competitive company is to eliminate duplication of service in the territory where the three companies have operated. The plan was found by the commission to be of advantage to the public. Fred R. Parrett, general manager and treasurer of the consolidated company, said that for the present there would be practically no change in the respective forces now working.

Why Kansas Company Reduced Rural Line Rates.

Considerable newspaper publicity was given the Emporia Telephone Co. when it recently made a voluntary application to the Kansas Public Utilities Commission for permission to reduce certain rates for rural telephone service. As applications by telephone companies for permission to reduce their rates are such rare occurrences, this one naturally attracted considerable attention.

In his application, W. W. Finney, manager of the Emporia company, stated that the farmer is producing crops for which he is receiving practically pre-war prices, but that he is still obliged to pay peak prices for everything that he purchases; that the average return of farmers served by the Emporia company last year was only $185 per family.

For this reason, Mr. Finney stated, he wished to do what he could to help the farmer out of his present financial difficulty and add his bit toward helping the farmers in his vicinity back on their feet financially—a very commendable thing for Mr. Finney to do and one in which every telephone man in Kansas would join, if their rates and plant conditions were the same as those of the Emporia Telephone Co.

Telephone companies all over the state have been and are doing everything possible to furnish the farmers adequate telephone service at the lowest possible cost, according to L. M. Kraege, secretary of the Kansas Independent Telephone Association, and while telephone rates for service are always computed on a cash basis of payment, telephone companies very often carry their rural subscribers over periods of crop failures without charging interest or in any way embarrassing the farmer by over-urging payments. Many times in doing this, the telephone men themselves are compelled to go to their banks and solicit loans upon which they must pay interest to procure ready money for meeting the expenses of furnishing service to the rural subscriber.

Two facts are worthy of note in the case of the Emporia Telephone Co.:

First, that the lines, over which this service is furnished to rural subscribers, are owned and maintained by the farmers and extend to the city limits; that the telephone instruments are the only equipment furnished these subscribers by the Emporia Telephone Co.; that a rate of $1 per month for this class of service had for some time been charged and Mr. Finney believed that here was an opportunity to assist the distressed farmers by making the reduction at this time from $1 to 75 cents per month.

The second fact to be noticed is that this reduction is understood to be only temporary, to meet the exigencies of this year, and that Mr. Finney hopes to have the old rates restored as soon as the financial conditions of the farmers improve sufficiently to warrant their going back to the old rate of $1 per month.

This reduction of 25 cents per month does not apply to that class of rural service where rural subscribers are furnished service over equipment entirely owned and maintained by the Emporia Telephone Co. Hence, it would appear that the service affected is a form of rural switching service and is in no wise a general reduction on all forms of rural service.

U. S. Supreme Court to Decide Validity of Bell Injunction.

While a third temporary injunction—properly signed by three federal judges—was issued last month restraining the Louisiana Public Service Commission from

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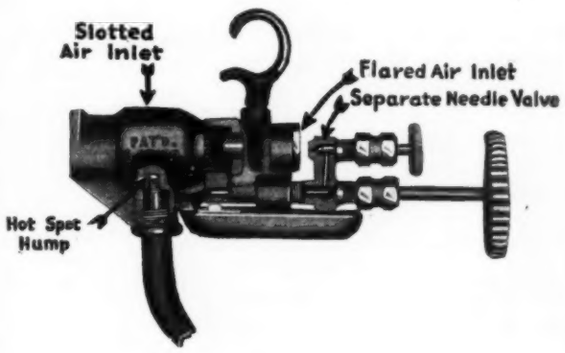

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enforcing reduced rates in the Louisiana territory of the Cumberland Telephone & Telegraph Co., the validity of the first injunction will be decided by the United States Supreme Court after the hearing on April 9.

The first injunction was issued by Federal Judge Foster and dismissed by an order of three federal judges.

The second injunction was declared invalid by the supreme court because it had been signed by only one judge.

Better Service Brings Higher Rates in Mansfield, Ohio.

A rate increase has been granted the Mansfield Telephone Co., of Mansfield, by the Ohio Public Utilities Commission because of improved service. The order was entered January 4, becoming effective at once.

The new schedule increases business and residence rates, on both one and two-party lines, 50 cents a month. Four-party business and residence and rural business stations are increased 25 cents a month.

West Virginia Town Demands Probe of Telephone Service.

Request for an immediate and searching investigation by the West Virginia Public Service Commission of the service rendered in Huntington by the Chesapeake & Potomac Telephone Co. was made in a letter sent December 30 by Mayor F. S. Chapman.

The letter registered formal complaint that the company had failed to install telephones—both business and residence—within a reasonable time after requests had been made and in many cases had not rendered prompt and efficient service with equipment already installed.

Summary of Commission Rulings and Schedule of Hearings.

INTERSTATE COMMERCE COMMISSION.

January 10: Application filed by Southwestern Bell Telephone Co. for authority to acquire the property of the Kinloch Long Distance Telephone Co. and the Kinloch Telephone System, both of St. Louis, Mo.; also to acquire the Sedalia Home Telephone Co., of Sedalia, Mo.

ALABAMA.

January 5: Southern Bell Telephone & Telegraph Co. ordered to improve service and equipment at Sylacauga.

CALIFORNIA.

January 5: Authority given H. P. Harralson to construct a telephone line from Dimuba to General Grant National Park; application of Reedley Telephone Co., of Reedley, to extend its line to the national park, denied.

January 9: Santa Paula Home Telephone Co., of Santa Paula, authorized to issue $7,000 face value of its 5 per cent bonds, to be sold for not less than 85 per cent of their face value plus accrued interest; proceeds to be used in part payment of indebtedness incurred for construction.

ILLINOIS.

January 16: Hearing held at Springfield on application of Central Telephone & Telegraph Co. to increase rates for service in Paxton.

January 17: Hearing held at Springfield on application of Illinois Bell Telephone Co. for approval of sale of a telephone system extending from certain points on the Illinois-Wisconsin line to a point in Kenosha, Wis., for the sum of $6,940.

January 17: Hearing held at Springfield on the joint petition of W. F. Murdock and others, copartners operating as the Murdock Mutual Telephone Co., and the Murdock Mutual Telephone Co., approving sale by the former and purchase by the latter of the telephone property in the village of Murdock and vicinity; also for authority to the Murdock Mutual Telephone Co. to issue capital stock to the amount of $1,500, and for a certificate of convenience and necessity to operate the acquired property.

January 18: Hearing held at Springfield on citation to Mendon Telephone Co. and the Telephone Exchange of Loraine, in the matter of failure of the Mendon company to connect certain toll circuits from the Loraine exchange to the Mendon Telephone Co.'s switchboard at Mendon.

January 18: Hearing held at Springfield on the proposed rate advance for service by the Byron Telephone Co. in Byron and Stillman Valley.

January 18: Hearing held at Springfield on petition of LaHarpe Telephone Co. to increase rates in LaHarpe.

January 18: Hearing held at Springfield on supplemental petition of Farmers Fountain Telephone Co., of Columbia, for authority to issue $84,000 of its capital stock.

MISSOURI.

January 11: Effective February 1, Dawn Telephone Co., of Dawn, authorized to continue present rate schedule now on file.

January 11: Elmer Telephone Co. granted permission to continue using the present rates now in effect at Elmer and Clifford.

January 11: In the matter of the complaint of the Community Telephone Co. against the Moss Telephone Co.; it appearing that the Community company does not intend to prosecute, complaint dismissed.

January 12: Permission given Salisbury Home Telephone Co. and Chariton County Telephone Co. to continue the existing toll rates for service between Salisbury, Keytesville and other points.

January 12: Shelbina Telephone Co. authorized to continue present schedule for service in Shelbina.

NEBRASKA.

January 8: Protest filed by residents and business men of Endicott against proposal of Lincoln Telephone & Telegraph Co. to close exchange because of inability to make expenses, and serve the subscribers from Steele City and Fairbury, averring business importance of town justifies continuance and that great inconvenience will result.

January 8: Complaint filed by L. Snyder, of Alexandria, against Lincoln Telephone & Telegraph Co., alleging that company acted "unethical" in charging him for the full 30 minutes it took to complete a three-minute conversation with town of Bartlett.

January 8: Application of the Pawnee Telephone Co. for increase in business rates allowed in part; management expenses restricted to $200 a month and bad collection percentage to 1.5 per cent.

January 9: In the matter of the applimation of the Cuming County Independent Telephone Co. for permission to issue $1,500 additional stock; it appearing that the company has assets of $103,400 against which only $56,363 of stock has been issued and that the money represented by the increased stock has been invested in additions and betterments, found that the additional capital is reasonably required for corporate purposes and permission granted.

January 10: Complaint filed by the Page Power Co. against the Page Telephone Co., alleging unwarranted use of its property in bracketing and crossarming, and a demand that the telephone company be required to rebuild its lines to avoid interference.

January 10: Complaint filed by Mark Murray against Park Valley Telephone Co. that it has announced its intention of changing into a mutual and has notified subscribers that unless they take stock in the company they will be denied any service.

January 10: Complaint filed by East Emerson Telephone Co. against Northwestern Bell, alleging refusal to give toll service unless toll charges are guaranteed.

January 11: Hearing at Cozad of application of the Cozad Mutual Telephone Co. for an increase in rates; testimony adduced and cause taken under advisement.

January 12: Application filed by the Scotia Telephone Co. for permission to publish joint-user rate.

January 12: Application filed by the Wehn Telephone Co. for permission to publish joint-user rate.

January 12: Application filed by the Platte Valley Telephone Co. for permission to publish a joint-user rate.

NEW YORK.

January 17: Hearing held at Albany on citation issued to Township Telephone Co., of Chaumont, to show cause for failure to complete and correct its 1921 report.

OHIO.

January 4: Rate increase, effective at once, granted the Mansfield Telephone Co. for service in Mansfield.

WISCONSIN.

January 6: Application filed by the Ryan Farmers Telephone Co., of Kewaunee, for authority to issue $4,800 of its capital stock for the purpose of securing funds with which to pay for additions and extensions to its property and plant.

January 9: Complaint filed by F. E. Tree and others of South Wayne against the C. M. & St. P. Ry. Co. praying for an order requiring the railway company to install telephone service in its depot at South Wayne.

January 9: Notice filed by the Reedsburg Telephone Co., of Reedsburg, of intention to extend its telephone lines in the town of Excelsior.

January 9: Authority given Manitowoc & Northern Telephone Co. to issue and sell $1,050 of its capital stock, funds to be used to pay for improvements to plant and property.

January 16: Hearing held at Madison on the proposed extension of the Fond du Lac Rural Telephone Co. in the town of Eden. T-1073.

January 19: Hearing held at Madison on the application of the Farmers Mutual Telephone Co., of Baraboo, for authority to increase its rates. U-2811.

January 23: Hearing at Madison on the application of the Siren Telephone Co., of Siren, for authority to increase its rates. U-2810.

January 25: Hearing at Madison on the application of the Freeman Telephone Co., of Mount Sterling, for authority to increase its rates.: U-2813.

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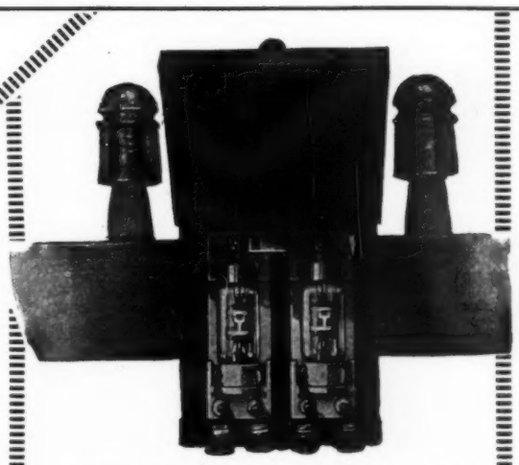

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New Telephone Companies and Incorporations.

CORCORAN, CALIF.—The Corcoran Telephone Co. has been organized with a capital stock of $25,000, of which $300 has been subscribed.

MURDOCK, ILL.—The Murdock Mutual Telephone Co. has been organized with a capital of $1,500. The incorporators are R. Y. McIntire, W. F. Murdock, E. W. Camrack, N. C. McKinney, J. F. Helm and R. B. Helm. Chadwick & Chadwick, attorneys at Tuscola, are the correspondents.

SEATON, ILL.—Mary E. Logan, F. L. Logan and J. L. Trowley have organized the Logan Telephone Co. with a capital of $10,000. Graham & Werts, of Aledo, are the correspondents.

BLUE RIVER, IND.—With a capital of $1,250, the Westland Telephone Co. has been incorporated to do business in Blue River township, Hancock county. The directors are C. V. Hardin, C. B. Lacy, F. C. Landrus, Otto Wyant and J. C. Hamilton.

SPENCER, IOWA—A certificate of incorporation has been issued to the Summit Center Telephone Co., with its principal place of business in Summit township—postoffice address, Spencer. The authorized capital is $600.

Those elected to hold office until the first annual meeting are: G. H. Schoeneman, president; W. G. Heikens, secretary; and Frank Mett, treasurer. The directors are: A. Mett, I. G. Heikens, S. Klampe, L. Nattress and Mr. Schoeneman.

YARMOUTH, IOWA—The Farmers Mutual Telephone Co. has been organized to do business in Des Moines county and vicinity. The capital stock is $10,000.

ATWOOD, KANS.—An organization called the Rawlins County Farmers Coöperative Telephone Co. has been formed and an application for a charter has been filed. The officers are: Chas. Rodenbeck, of Ludell, president; H. A. Jennings, of Herndon, vice-president; A. J. Haller, treasurer; and Joe Goltl, of Herndon, secretary. The directors include the officers and James Height, of McDonald; J. N. Peterson, Atwood; and M. H. Bird, Atwood.

CLEMENTSON, MINN.—The Rapid River Coöperative Telephone Co. has been organized to build and operate a telephone line from Clementson south along the Rapid river. It is planned to have the line in operation during the coming spring.

Officers elected are: President, F. C. Seymeur; vice-president, C. P. Eidem; secretary, J. Williamson; treasurer, E. Lund. J. Hovdahl has been chosen director.

ASHEVILLE, N. C.—Organization of a telephone company with the purpose of furnishing service to residents of the Avery's Creek section has been completed. Officers are: M. J. West, president and general manager; and John B. Rumbough, secretary-treasurer.

PITTSBURG, OKLA.—The Citizens Coöperative Telephone Co. has been authorized to operate an exchange at Pittsburg.

SALEM, S. D.—The Shinimel Telephone Co. has been incorporated by Harvey Shinimel, George Ellenbrecht, and Sam Shinimel, all of Salem.

SAN ANTONIO, TEXAS—J. E. Jarrett, G. Walker, N. M. Washer and L. B. Jones have incorporated the Blanco Road Telephone Co. with $1,000 capital stock.

NEWPORT, VA.—Articles of incorporation have been filed by the Blacksburg-Newport Telephone Co. The maximum capital is given as $5,000 and the minimum as $500. The incorporators are L. O. Price, of Blacksburg, president; A. L. Farrier, Newport, secretary; J. C. Givens, Newport; J. H. Luster, V. C. Austin, and C. P. Logan, all of Blacksburg; and L. L. Miller, of Newport.

ROCHESTER, WASH.—A new company, the Peoples Utility Co., has been formed from the Peoples Coöperative Telephone Co. The capital stock of the new company is $100,000 and the stockholders in the old company will receive twice the value of their stock in shares of the new company.

The following officers and directors were elected: President, T. I. Dodge, vice-president, A. J. Gesiell; treasurer, C. N. Mills; directors, Samuel Jones, H. W. Paul, T. I. Dodge, C. J. Norris and A. J. Gasiell.

EVANSVILLE, W. VA.—The Preston Telephone Co. has been organized by C. S. White, A. C. Sinclair, of Newburg; Oran Hamilton, J. C. Shroyer, and F. M. Cornwell of Thorton.

COUDERAY, WIS.—A charter has been granted to the Couderay Telephone Co., which was organized with a capital stock of $25,000. The officers are H. F. Mann, president; L. E. Vosburg, vice-president; and Mrs. H. A. Mann, secretary-treasurer.

Construction.

BUSHNELL, ILL.—The Farmers Telephone Co. is planning to place all wires underground in lead cables. This includes all rural lines running into Bushnell.

LOUISVILLE, KY.—Improvements and additions to the Shawnee exchange of the Home Telephone Co. will be made at a cost of approximately $20,000. A permit has been secured for the new addition, which will be a two-story brick structure. Work will be started within a short time.

ASHEVILLE, N. C.—The work of laying underground a 600-pair cable extending from the central office has been started by the Asheville Telephone & Telegraph Co. In certain sections poles will be placed, and additional facilities are planned for the immediate future to provide for handling at least 1,000 new subscribers. The company has a number of applications for service now on file.

TIFFIN, OHIO.—The Tiffin Consolidated Telephone Co. will place the wires in the city underground, starting the work in the business district.

ALTOONA, PA.—The Bell Telephone Co. of Pennsylvania has announced that it will erect a new steel, concrete and brick building, not less than six stories high, to be completed next summer. The approximate cost is given as $1,000,000.

HARRISBURG, PA.—A central office and exchange building will be erected by the Bell Telephone Co. of Pennsylvania, it was announced recently. It is designed to house practically all of the local branches of the company in Harrisburg.

SIOUX FALLS, S. D.—The Northwestern Bell Telephone Co. has built a new toll circuit from Sioux Falls to Crooks.

FRIENDSHIP, TENN.—A new switchboard has been installed by the Friendship Telephone Co. As a part of the program of H. T. Earnheart, who recently purchased the company, new poles, lines and other equipment have been put in and he plans to make the exchange one of the best in that section of the state.

GREENVILLE, TEX.—A construction program involving an expenditure of about $75,000 in the plant department has been started by the Greenville Telephone Co. The improvements include the installation of a network of cables to all parts of the city and will practically eliminate the overhead wires. A new exchange building is also contemplated, to be erected this year.

SAN ANTONIO, TEX.—Initial work in the $2,000,000 improvement program of the Southwestern Bell Telephone Co. in this city was launched recently. A new exchange is planned to relieve present congestion and to take care of the waiting list of applications.

SONORA, TEX.—The construction of a metallic line between Sonora and Rocksprings is progressing rapidly. The project will cost about $15,000.

SPOKANE, WASH.—Approximately $229,170 is being expended upon improvements or construction work by the Pacific Telephone & Telegraph Co. and the Home Telephone & Telegraph Co. in Spokane and vicinity, both on work about to be undertaken and that which is nearing completion.

BECKLEY, W. VA.—The Chesapeake & Potomac Telephone Co. placed its new automatic common battery telephone system in operation recently.

HUNTINGTON, W. VA.—Switchboard equipment costing more than $200,000 was placed in service a few weeks ago by the Chesapeake & Potomac Telephone Co. The latest addition to the central office consists of a complete unit of switchboard and associate equipment. It was necessary to remodel the main building and the garage office building in order to house the new equipment.

CASCO, WIS.—A new exchange will be erected by the Casco-Brussels Telephone Co. on the site of the one destroyed by fire recently.

GREEN BAY, WIS.—Work has been started on a $50,000 addition to the Wisconsin Telephone Co.'s exchange which, it is estimated, will take care of needed extensions in service until 1930.

MEDFORD, WIS.—A new building, which will contain modern equipment, is to be constructed by the Midway Telephone Co.

MONROE, WIS.—A two-story building, to be erected by the United Telephone Co., will be used for a warehouse and garage.

WABENO, WIS.—Extensive improvements are being made on the toll lines of the Carter & Wabeno Telephone Co.

Financial.

LOUISVILLE, KY.—On January 2 the Louisville Home Telephone Co. paid a dividend of $1.75 a share. It has also

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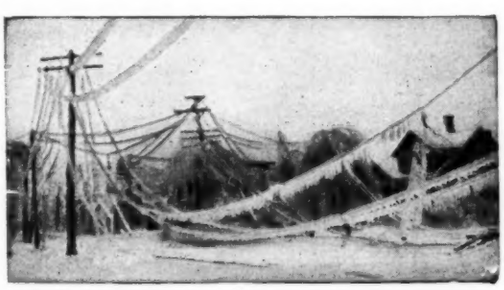

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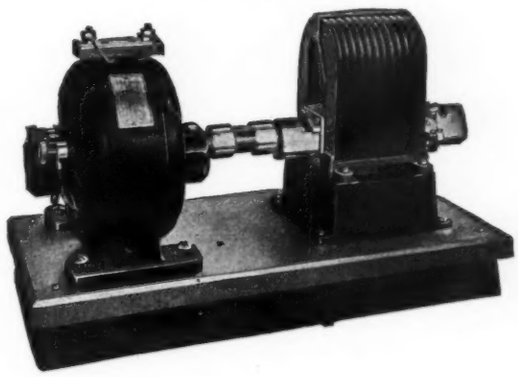

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COOKEVILLE, TENN.—Application has been filed with the secretary of state by the Gainesboro Telephone Co. for authority to increase its capital stock from $249,000 to $400,000.

Elections.

CLANTON, ALA.—At the annual meeting of the Peoples Telephone Co. the following officers were elected: President, J. D. Collins; vice-president, M. D. Foshbee; secretary-treasurer, J. N. Dennis. The board of directors comprises: J. M. Robinson, M. Parrish, W. Littlejohn, J. Z. Mims and W. J. Morris.

The company is a mutual concern composed of about 1,200 residents of Chilton County.

VIOLA, ILL.—The following officers and directors were elected at the annual meeting of the Viola Mutual Telephone Association: W. Stancliff, president; W. McAn, vice-president and general manager; L. L. Park, secretary-treasurer; R. H. Spicer, J. S. Pinkerton, C. G. Peterson, F. Bollman and C. W. Liebendorfer, directors.

WESTPOINT, IND.—L. J. Clement has been elected president of the Westpoint Telephone Co. for the year 1923. Other officers chosen are: M. B. Ford, secretary-treasurer; D. G. Cheesman, manager. Serving on the board of directors are: G. C. Wolferd, G. W. Burton, T. M. Irwin, J. E. Clarkson, G. W. Brown and S. R. Stover.

BIRMINGHAM, IOWA.—The stockholders of the Mutual Telephone Co. have elected the following directors for the coming year: J. McDonald, E. Laughlin, W. P. Meek, D. A. Miller, W. R. Boon, C. C. Johnston, G. Baldwin and H. Jackson. The directors elected the following as officers: D. A. Miller, president; J. Woodrow, vice-president; W. Blown, secretary; and C. H. Graham, treasurer.

CORNING, IOWA—The following officers were elected for the coming year at the recent annual meeting of the Farmers Mutual Telephone Co.: Ed Hogan, president; Bert James, vice-president; N. M. Wetzel, secretary; and Abe Edwards, treasurer. The directors are: C. H. Lund, Andrew Nelson, Theo. Barker, O. C. Brokaw and E. L. Humbert.

ROCKPORT, MAINE.—At the recent annual meeting of the Rockport Mutual Telephone Co. two directors were elected for the ensuing term. They are F. Hughes, to succeed himself, and Dr. O. M. Chamberlain to take the place of F. Kimball, retiring.

The reports showed the company to be in good financial condition, and credit for this status was given to Fred McBeath, treasurer and general manager.

Aberdeen, S. D.—W. G. Bickelhaupt has been elected president of the Dakota Central Telephone Co., to succeed J. L. W. Zietlow, deceased. E. E. Ingham, who has been assistant auditor for the company, takes Mr. Bickelhaupt's position as treasurer, while B. C. Lamont will be the new secretary. The other officers of the company are C. N. Herreid, vice-president, and J. F. Zietlow, general superintendent.

Miscellaneous.

HUNTINGTON BEACH, CALIF.—E. H. Cookingham, of Spokane, Wash., has purchased the plant of the Huntington Beach Telephone Co.

HUME, ILL.—F. K. Page, administrator of the estate of G. W. Hughes, has disposed of the Hume and Brocton exchanges of the Hume Telephone Co. to H. B. Crandall, of Springfield.

JEFFERSONTOWN, KY.—The Fern Creek Home Telephone Co. has filed amended articles of incorporation, fixing its liability limit not to exceed the capital.

BRYAN, OHIO.—The Williams County Telephone Co. has taken over the Citizens Telephone Co., of West Unity, and the companies are now operated under one management.

PUKWANA, S. D.—A deal has been consummated whereby J. Verschoor, of Kimball, becomes the owner of the Stransky Telephone Co. The Stransky company serves over 400 subscribers. Mr. Verschoor also owns the Kimball telephone lines and has had much experience in the business.

KERENS, TEXAS.—J. W. Whatley has bought the lines and equipment of the Kerens Independent Telephone Co. He plans on making extensive improvements at an early date.

ORANGE GROVE, TEX.—The Orange Grove Telephone Co. has been sold by L. E. F. Townsend to Ed. Havemann, of Casa Blanca.

SPOKANE, WASH.—The Interstate Utilities Co. has purchased the exchanges at Tekoa, Wash., and Plummer, Idaho. Improvements will be made to both plants as rapidly as possible.

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